REPORT RESUMES

ED 011 053 48

A STUDY OF METHOD IN LANGUAGE-AND-CULTURE RESEARCH. FINAL REPORT.

BY- MATHIOT, MADELEINE
MATHIOT (MADELINE), LOS ANGELES, CALIF.
REPORT NUMBER BR-5-1233 PUB DATE 66
CONTRACT OEC-2-14-007
EDRS PRICE MF-$0.63 HC-$16.56 414P.

DESCRIPTORS- *STRUCTURAL ANALYSIS, *AMERICAN INDIAN LANGUAGES, *PAPAGO, *LANGUAGE RESEARCH, *CULTURAL FACTORS, *COGNITIVE MEASUREMENT, CONCEPTUAL SCHEMES, LOS ANGELES

A STRUCTURAL APPROACH TO THE COGNITIVE ANALYSIS OF LANGUAGE WAS PRESENTED IN THIS RESEARCH ON THE LANGUAGE AND CULTURE OF THE PAPAGO INDIANS OF ARIZONA. IN THIS STUDY, THE COGNITIVE PATTERNS OF A LANGUAGE WERE CALLED "THEMES OF THE LANGUAGE" AND THE COGNITIVE PATTERNS OF NONVERBAL CULTURE WERE CALLED "THEMES OF THE CULTURE." BOTH KINDS OF THEMES WERE CONSIDERED TO BE FEW IN NUMBER AND PATTERNED. THE HYPOTHESIS OF THE STUDY WAS THAT THE THEME STRUCTURE OF THE LANGUAGE IS SEPARATE FROM THE THEME STRUCTURE OF THE CULTURE BUT IS RELATED IN VARYING DEGREES. THIS HYPOTHESIS IS DIFFERENT FROM THE SAPIR-WHORF HYPOTHESIS THAT THE COGNITIVE DOMAIN OF LANGUAGE IS DIRECTLY RELATED TO CULTURE AND THUS INFLUENCES CULTURAL BEHAVIOR. THIS COGNITIVE STUDY OF THE PAPAGO LINGUISTIC SYSTEM STRESSED THE IMPORTANCE OF OPERATIONALLY DEFINED CONCEPTUAL TOOLS AND ADHERENCE TO AN ESTABLISHED SEQUENCE OF ANALYTIC STEPS. THIS APPROACH TO THE COGNITIVE ANALYSIS OF LANGUAGE YIELDED THREE TYPES OF RESULTS, NAMELY, (1) ANALYTICALLY DERIVED CONTENTS, (2) SUGGESTED THEMES, AND (3) A SUGGESTION REGARDING THE RELATIONS THAT MAKE UP THE THEME STRUCTURE. THE RESULTS WERE JUDGED BY A CRITERION OF LOGICAL RELIABILITY, AND IT WAS CONCLUDED THAT THE THREE RESULTS MET THE CRITERION IN VARYING DEGREES. (GD)

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FINAL REPORT

under Contract No. OE-2-14-007

A Study of Method in Language-and-Culture Research.

(Revised and expanded version)

c. 1966

Submitted to the U. S. Office of Education by

Madeleine Mathiot
449 Skyewiay Road
Los Angeles, Calif. 90049

ED011053

To be published in:
Publications of the
Indiana University
Research Center in
Anthropology, Folk-
lore and Linguistics

AN APPROACH TO THE COGNITIVE STUDY OF LANGUAGE

Madeleine Mathiot

Los Angeles, Calif.

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0 Introduction

This monograph presents an inductive approach to the study of the relation between the language, the culture and the cognitive system of a people. The approach was developed and generalized on the basis of two detailed studies and it was tested by applying it to a third study. The language-and-culture situational context dealt with is that of the Papago Indians of Arizona.

A cognitive system is here characterized after Frake as being "The principles by which people in a culture construe their world..."[1]; in short, it is their world view, i.e., their unformalized conception of reality.[2] To designate the principles organizing a people's conception of reality, the term "theme" is adopted without restricting it, however, to the sense in which Opler uses it. It is intended to refer to any cognitive pattern that can be inferred from the observation of cultural behavior, verbal or nonverbal.

0.1. Overall hypothesis

The distinction between language and the rest of culture is fundamental to the present approach. In terms of the study of the cognitive system of a people this distinction implies that the cognitive patterns reflected in their language are to be distinguished from the cognitive patterns reflected in their nonverbal culture, i.e., all of their culture outside of language. The latter are called the *themes of the culture.* The former are called the *themes of the language*.

The properties commonly attributed to the themes of a culture are here extended to the themes of a language: both kinds of themes are believed to be (a) few in number, and (b) patterned.

Each set of patterns is viewed as constituting a separate system, namely the *theme structure of the culture* and *the theme structure of the language*, respectively.

The hypothesis underlying the present approach is that the theme structure of the language is related to the theme structure of the culture. The degree to which the two structures are related constitutes the degree of *integratedness* of the language into the total culture. Such a hypothesis, therefore, allows for varying degrees of integratedness of a language into a culture, as may become apparent both in the synchronic comparison of different language-and-culture situational contexts and in the diachronic comparison of the same language-and-culture situational context.[3]

The assumption implicit in the usual interpretation of the Sapir-Whorf hypothesis is that the cognitive domain of language is directly related to culture, thus influencing cultural behavior. In the present approach, this assumption is replaced by the postulation of two separate theme structures related to each other in varying degrees. Thus, instead of direct correlations, an intermediate level is proposed. This means that language and culture relations are expected to emerge on a higher level of abstraction. This also means that no necessary determinism is postulated in the relation of language to culture.[4]

0.2. Scope of proposed ~~procedure~~ approach

In terms of the theoretical position adopted here, a complete study of the cognitive system of a people includes three objectives: (1) the uncovering of the themes and the theme structure of the language, i.e., the cognitive analysis of a given language; (2) the uncovering of the themes and the theme structure of the culture, i.e., the cognitive analysis of a given culture; (3) the determination of the degree of integratedness of the language into the culture, i.e., the determination of the relation of a given language to a given culture.

This monograph is an account of the approach proposed for the investigation of the first objective. Such an investigation includes two major stages. The first stage consists in uncovering the cognitive significance specific to selected aspects of the linguistic system, i.e., their *cognitive contents*. The second stage consists in inferring from these cognitive contents the themes and the theme struture of the language.

The detailed description of the approach proposed to meet the goal of the first stage is presented in sections 3 and 4 below. It is preceded by a discussion of (1) the theoretical assumptions on which this approach is based and (2) the methodological apparatus which it has been observed to entail (see sections 1 and 2 below). It is followed by a discussion of the approach proposed to meet the goal of the second major stage (see section 5 below).

1. Basic assumptions and their bearing on present approach

The basic assumptions of the present approach pertain to the general nature of the problem area, namely, the cognitive study of the linguistic system. They concern the following questions: What characteristics of the linguistic system, and what aspects of cultural behavior, are relevant to the cognitive study of language?

The basic assumptions constitute the point of departure for the present research. Everything else that concerns the cognitive analysis of language, from the conceptual tools to their bearing on the present approach, stems from observation.[5]

1.1. Linguistic system

The characteristics of the linguistic system assumed to be relevant to its cognitive study are of two types, external and internal. The external characteristics are the functions of language. The internal characteristics are those pertaining to its structure.

1.1.1. Functions of language

Not all the functions of language are considered to be equally relevant to a cognitive study. It is assumed that the cognitive domain of the linguistic system is directly associated with the primary function of language, namely, the referential function. The secondary functions of language, namely, the expressive function and the appeal function are directly associated with the affective processes such as motivation and emotion. They are only indirectly associated with cognition, in the sense of influencing it or being influenced by it.[6]

The bearing of these assumptions on the cognitive study of language is as follows: such a study can be said to aim at inferring the cognitive significance of the referential meanings[7] of the linguistic signs.

Fundamental to the present approach, therefore, is the assumption that linguistic signs have both semantic and cognitive features.

The distinction between semantic and cognitive that is proposed here is as follows: The semantic domain of a language is the relation between the signs of that language and the reality they stand for, i.e., denote and connote.

The cognitive domain of a language is the relation between the speakers of that language and reality as mediated by the language.[8]

A methodological tenet crucial to this approach is that any facet of the linguistic structure can be analyzed in terms of distinctive features, i.e., characteristics in terms of which relevant structural distinctions are formulated.

In line with the above, the aspects of the two domains of language that are pertinent to the cognitive analysis of language include: in the semantic domain, semantic distinctive features; in the cognitive domain, cognitive content and cognitive distinctive features.

The semantic distinctive features of a given aspect of language are defined as the invariant characteristics of the meaning of that aspect as revealed by the naming units pertinent to its investigation (see section 2.1.4. below).[9]

The cognitive content of a given aspect of language is the cognitive significance specific to that aspect (see section 2.1.5. below).

It is proposed that the cognitive content of a given aspect of language can also be analyzed in terms of distinctive features. These features are called cognitive distinctive features. They are regarded as constituting the cognitive content of a given aspect of language.

The procedure followed in this approach for the inference of semantic and cognitive distinctive features is described in section 2.2.2. below.

1.1.2. Structural characteristics of language

Three general characteristics of the structure of language are considered directly relevant to its cognitive study. Listed in decreasing order of generality they are the following: a characteristic which language shares with all structured systems, namely that of having categories, units and properties; a characteristic which language shares with all sign systems, namely that of displaying the covariance of form and meaning; a characteristic unique to language, namely that of having two dimensions, the grammatical and the lexical.

1.1.2.1. Categories, units and properties

The term "linguistic category" is used to designate any pattern or subpattern of language displaying the form-meaning covariance. Linguistic categories could be classified in several ways, for instance, in terms of formal differences. Thus, categories in which the form-meaning covariance is manifested in units (such as morphemes) could be differentiated from those in which it is manifested through a process (such as reduplication). At this stage, however, no classification of linguistic categories is attempted, since it is not yet known what distinctions are relevant to the cognitive study of language (see section 2.3.3.1. below).

The term "linguistic unit" is used to designate any separable entity which participates in a pattern or subpattern of a language. Two types of linguistic units are differentiated in terms of the way in which their boundaries are established: behavioral units and analytic units. The boundaries of behavioral units are observable in the behavior of the native speaker. The boundaries of analytic units have to be ascertained by linguistic analysis. Thus an utterance is a behavioral unit, but a phoneme is an analytic unit.[10]

The term "*linguistic property*" is used to designate any single characteristic feature either of language in general or of an aspect — such as a particular linguistic category or a particular type of unit — of a given language. Unlike linguistic categories, linguistic properties are not defined in terms of the form-meaning covariance. The latter is only one of the properties of language.

Two general assumptions are made regarding the relevance of linguistic categories, units and properties to the cognitive study of language. The first assumption is that all three of these aspects of language potentially have cognitive significance. The second assumption is that the cognitive significance of a linguistic category or a linguistic property can be inferred from an examination of the linguistic units which are relevant to that category or property.[12]

The bearing of these two assumptions on the cognitive study of language is that they bring out the importance of the selection of appropriate linguistic units for purposes of the analysis. This is discussed in detail in section 2.1.1.below.

Two additional general assumptions are made regarding the nature of the cognitive significance of linguistic categories, units and properties. The first assumption is that the cognitive significance of linguistic categories is specific to a given language, whereas that of both linguistic units and properties can be either specific or universal.[12] The second assumption is that the cognitive attributes — i.e., general cognitive characteristics — of linguistic categories, units and properties differ in kind. Linguistic categories are assumed to have the cognitive attribute of reflecting the cultural categorization of reality. Linguistic units, on the other hand, are assumed to have the cognitive attribute of reflecting the cultural segmentation of reality.[13] The cognitive study of the linguistic property conducted in the course of the present research suggests that the cognitive attribute of linguistic properties might be that of reflecting ~~linguistic~~ cognitive processes relevant to the cognitive system (see sections 3.2.1.4.2. and 3.2.4.1.3 (below).

The bearing of these two additional assumptions on the cognitive study of language is as follows: They bring out the importance of investigating not only both linguistic categories and linguistic properties but also different types of linguistic categories and different types of linguistic properties.

An attempt in this direction is the choice of a category and a property for the two initial studies conducted in this research.

1.1.2.2. Form-meaning covariance

This refers to the circumstance that when linguistic form varies, linguistic meaning, almost always, varies with it, and conversely.[14]

The bearing of the form-meaning covariance on the cognitive study of language is that, as in the case of linguistic analysis (see definition of categories, properties, and units in section 1.1.2.1. above), it is upon this covariance that the whole analysis rests.

The form-meaning covariance provides the criteria for some crucial tasks to be performed in the course of the cognitive analysis of a given aspect of language. These include: (1) the determination of the characteristics pertaining to, and the conditions affecting, the aspect of language under investigation that are assumed to have bearing on this investigation (namely, linguistic and cultural variables, semantic distinctive features and underlying concept, see sections 2.1.2.1., 2.1.4, 2.1.3. below).

1.1.2.3. Grammar and lexicon

It is essential to the present approach that grammar and lexicon be considered two dimensions of language and therefore be kept separate. Each dimension is viewed as sharing the general structural characteristics of language. This means that both dimensions have categories, units and properties, and exhibit the form-meaning covariance. Thus language can be said to have, on the one hand, grammatical categories and lexical categories, grammatical units and lexical units, grammatical properties and lexical properties, and, on the other hand, both a grammatical structure and a lexical structure, both grammatical meaning and lexical meaning.

It is assumed that both grammar and lexicon potentially have cognitive significance.[15] It is further assumed that, although the cognitive significance of either dimension should be investigated separately, not only the same data base (i.e., collection of data on which to base the investigation) but also the same approach apply to both dimensions.

The bearing of these assumptions on the cognitive analysis carried out here is as follows:

In the customary approach to language-and-culture studies, the focus of interest is either the grammar or the lexicon. The former is illustrated by Whorf's study of habitual thought and behavior, the latter by the well-known example of the Eskimo words for snow.

In the present approach, the place of the grammar and that of the lexicon are viewed differently. The formulation of a particular problem may be suggested by either one or the other. Thus, in Papago, a problem raised by a grammatical category is illustrated by that of possessiveness.[16] The possessive marker =ga occurs in the form ñ=keli=ga "my-husband", but not in the form ñ=kii "my-house".[17] This suggests the cognitive problem of the Papago concept of possession. A problem raised by a lexical category is illustrated by the lexical set of verbs of position which includes keek, daha, kaac, and voʔo, roughly translated by English "stand", "sit", "spread", and "lie" respectively. Entities such as bottle, house, or song are said to "stand"; entities such as cup, button, ball are said to "sit"; entities such as ashtray, shirt, road, famine are said to "spread"; entities such as pencil, corpse, snake, or the moon it its first or last quarter, are said to "lie". The cognitive problem, in this case, is to determine what principles underlie the cultural classification of entities as reflected in the patterns of cooccurence of their names with the four verbs of position mentioned above (see section 4.2.1.1.2. below).

Once a problem is chosen, its investigation draws upon both the grammatical and the lexical dimension in the following way: The linguistic conditions pertinent to the problem under investigation are the features of the linguistic system, grammatical and/or lexical, in terms of which the aspect of language varies (see section 2.1.2. below). The data pertinent to the investigation are the behavioral units of the lexical dimension (i.e., the naming units) that have bearing on the category or property in question (see section 2.1.1.below).

1.1.3. The linguistic system and the themes of the language.

The assumptions regarding the cognitive relevance of the external and internal characteristics of language can be summarized as follows: of the functions of language, only the communicative function is directly relevant; consequently, denotative meaning is most directly relevant; of the general structural characteristics of language, all are potentially directly relevant.

The term "potentially relevant" is used to stress two qualifications: not every detailed characteristic (e.g., not every category) of language is assumed to be necessarily relevant, nor are all relevant detailed characteristics of language assumed to be equally relevant. It is believed that these further specifications of relevance can be made only on the basis of the thorough investigation of a variety of problems.

A final assumption is made concerning the overall relation of the linguistic system to the themes of the language. No one-to-one correspondence is assumed between the categories and properties of the linguistic system and the themes of the language. More specifically, it is assumed that several linguistic aspects may reflect a single theme, and several themes may be reflected in a single aspect.

The bearing of this assumption on the cognitive study of language is that it brings out the importance of the distinction between the cognitive contents of specified aspects of a given language and the themes of that language. This distinction is discussed in detail in section 5.2. below.

1.2. Cultural behavior

In line with the Saussurean distinction between langue and parole it is proposed that a system be studied through the observation of the behavior manifesting it.[18] Thus the cognitive significance of the linguistic system should be studied through the cultural behavior relevant to it. It is proposed that this includes nonverbal as well as verbal behavior.

1.2.1. Nonverbal behavior

The nonverbal behavior assumed to be relevant is that associated with the linguistic system, such as gestures, hesitation phenomena and all those features that have been summed up under the heading of "paralinguistics" by authors such as Trager.

It is believed that paralinguistic behavior can be interpreted only in terms of an established cognitive frame of reference. Consequently it was not considered in the present study.

1.2.2. Verbal behavior

It is the cultural behavior which manifests the linguistic system. It is proposed that two modalities of verbal behavior can be distinguished on the basis of naive native speakers' responses. These two modalities are speech behavior and naming behavior.[19]

Speech behavior refers to the utilization of the linguistic system for the transmission of messages as well as for the reference to certain phenomena.[20] Speech behavior, therefore, while it manifests the grammatical dimension of language, also involves some areas of the lexicon.

Naming behavior, on the other hand, refers to the utilization of the linguistic system for the reference to, and classification of, concrete phenomena.

The reference to concrete phenomena is observed in the use of naming units, i.e., the culturally established names of concrete entities and actions. The classification of concrete phenomena is observed in the grouping of naming units into *folk-taxonomic* classes.[21]

Naming behavior is the only aspect of verbal behavior utilized so far in this research (see section 2.1.1. below).

The bearing of the distinction between system and behavior on the cognitive study of language is that it brings out the importance of two distinctions: The first distinction is that between analytic units versus behavioral units in the two dimensions of language (grammar and lexicon). The second distinction is that between various types of analytic and behavioral units in each of the two dimensions of language. This is discussed in more detail in section 2.1.1. below.

2. Methodological apparatus

The following sections include (1) a discussion of the conceptual tools crucial to the present approach, (2) a description of the individual procedures to be used in the course of the analysis of any given aspect of language, and (3) an account of the way in which the general sequence of analytic steps to be followed in any given analysis was first arrived at and then generalized.

2.1. Conceptual tools

These include the source of linguistic data on which to base the cognitive study of language, called data base, the conditions of variation that affect the aspect of language under investigation, called variables, the probable universal concept assumed to be manifested in the aspect of language under investigation, called the underlying concept, the notions of semantic distinctive features and cognitive content, finally, the identification and subdivision of the cognitive problem area in which the aspect of language under investigation is included. These conceptual tools will now be discussed in turn.

2.1.1. Data base

It is believed that the choice of a data base depends on the analytic orientation adopted for the investigation. The orientation of the present study is intended to be structuralist. As understood here, the methodology of structuralism is one of qualitative contrast. Its aim is to ascertain qualitative differences between relevant entities by observing them under conditions in which they contrast with each other.[22] This presupposes entities which are both discrete and comparable.

In the case of the cognitive study of language such entities are linguistic units, both analytic and behavioral (see section 1.1.2.1. above).

Previously obtained analytic units relevant to this study are: in the grammatical dimension, morphemic units of various orders (such as morphemes or words); in the lexical dimension, lexical units of various orders (the minimal units being single lexemes, higher order units being lexeme clusters and lexeme conjuncts).[23]

The behavioral units of the grammatical dimension relevant to this study are informant words.[24]

In the lexical dimension several types of behavioral units can be distinguished depending on whether they are manifested in speech behavior or in naming behavior (see section 1.2.2. above). So far, however, standardized techniques of data collection are available for a single type, *naming units*. Naming units are defined as the culturally established names of concrete entities and actions. They refer to perceptually identifiable (i.e., concrete) phenomena for which simple behavioral tests — such as pointing — or their behavioral substitutes — such as reproduction by pictures or mimicking — can serve as unambiguous defining criteria. Naming units are therefore the only lexical behavioral units considered in this research.[23]

Once the analytic and behavioral units available at this stage of the research have been identified, the problem is to ascertain which one is best suited to serve as a data base for the cognitive study of a language.

The first question to be answered is: should it be a unit of the grammatical dimension or one of the lexical dimension? In making a choice, the following considerations are pertinent:

It is believed that units of the grammatical dimension do not necessarily have lexical status in addition to their grammatical status (by linguistic status is meant participation in a given aspect of language, such as a given linguistic category).

Thus a given grammatical unit such as a morpheme or a word may not be an entire lexical unit but only a part of one. For instance, the word *kusvo* "neck" is a lexical unit, namely a lexeme, whereas the word *kusvokam* "one-with-a-neck" is only part of the single lexeme *cev kusvokam* "giraffe (lit.: long one-with-a-neck, i.e., one with a long neck)". All units of the lexical dimension, on the other hand, have grammatical as well as lexical status. Thus a given lexical unit will, in addition to being either a single lexeme, a lexeme cluster or a lexeme conjunct, also be a word, a phrase or a part-clause. For instance, the single lexeme *Geʔe-Kii* "Meeting--House (lit.: big--house)" is a single word, namely a compound; the lexeme cluster *kokdam ha=kii* "hospital (lit.: sick-ones their=house)" is a phrase; the lexeme conjunct *geʔe kii* "a big house" is also a phrase.

In view of the assumption (stated in section 1.1.2.3. above) that both dimensions of the linguistic system are relevant to the cognitive study of language, a unit which necessarily has status in both dimensions is preferable to one that does not. Consequently, the data base should consist of units of the lexical dimension.

The second question to be answered is: should the data base consist of behavioral units (i.e., naming units) or of analytic units (i.e., lexemes, lexeme clusters, lexeme conjuncts)? In making a choice, the following considerations are pertinent: In the lexical dimension, because of the special nature of naming behavior (see section 1.2.2. above), all the analytic units are also behavioral units: all lexical units (lexemes, lexeme clusters, lexeme conjuncts) are also naming units.[26] All naming units, therefore, have potential but not yet assigned analytic status. Being unassigned, they are not restrictive. They are therefore preferable as data base to any given type of analytic unit which would be restrictive, since the type(s) not chosen would be excluded from the data base.

In summary: It is proposed that the data base for the cognitive study of a given language should consist of the lexical behavioral units of that language, since they allow for a maximal differentiation of linguistic categories and properties in both the grammatical and the lexical dimensions. Ideally, the data base should include all the lexical behavioral units of the language, a requirement which needs to be qualified further since it can not be met in practice.

At this stage of the research, the data base is restricted to naming units, the only behavioral units of the lexical dimension for which simple means of data collection were available at the onset (see fn 20).

2.1.1.1. Data base versus carriers of the linguistic aspect under investigation

In every detail of the cognitive study of a given aspect of language, it has proved to be essential to distinguish between the data base and the carriers of the linguistic aspect under investigation.

The carriers of a given aspect of language are the units, grammatical or lexical, which contrast with each other on the basis of that aspect. The linguistic status of the carriers of a given aspect of language depends on that aspect. If it is a grammatical aspect, the carriers are grammatical; if it is a lexical aspect, the carriers are lexical. The linguistic status of the units making up the pertinent data base, on the other hand, is independent of the aspect under investigation. For any cognitive investigation of the type proposed here, the data base is constituted by naming units (see section 2.1.1. above). The data base may — but need not — include the carriers of the aspect of language under investigation.

2.1.1.2. Data base versus universe of data and pertinent data

As previously stated (see section 2.1.1 above) the data base constitutes the entire source of linguistic data for the cognitive study of language. For the complete investigation of a given problem area (see section 2.1.6.2 below), only a portion of the data base may be directly relevant. That portion is called the *universe of data*.

In addition, for each stage in the investigation of a given problem area, only a portion of the universe of data may be directly relevant. That portion is called *pertinent data*.

The questions pertaining to the selection of both the universe of data and the pertinent data are discussed in section 3.1.2.1. below.

2.1.2. Variables

These are the conditions that affect the form-meaning covariance of a given aspect of language as revealed by the naming units of the pertinent data and have bearing on the cognitive study of that aspect.

Variables are differentiated on the basis of two criteria: (1) their nature and (2) the closeness of their connection to the aspect of language under investigation.

The first criterion serves to distinguish linguistic variables from cultural variables. The second criterion serves to distinguish initial variables from additional variables.

It should be noted that these two criteria not being mutually exclusive, the initial variables as well as the additional variables may include both linguistic and cultural variables.

The relation between the various types of variables and the aspect of language under investigation is shown schematically in Diagram I.

2.1.2.1. Linguistic variables versus cultural variables

By linguistic variables are meant the linguistic conditions that (a) affect the form-meaning covariance of the aspect of language under investigation as revealed by the naming units of the pertinent data and (b) have bearing on the cognitive study of that aspect (see section 2.1.2. above).

In line with the general assumption regarding the cognitive relevance of both grammar and the lexicon previously discussed (see section 1.1.2.3. above) linguistic variables may be either grammatical or lexical. The order of priority for the examination of the two types of linguistic variables is the extent of knowledge: that which is better known is examined before that which is less well known. In terms of this criterion, grammatical variables have priority over lexical variables at this stage in our linguistic knowledge.

By cultural variables are meant the cultural conditions[27] that (a) affect the form-meaning covariance of the aspect of language under investigation as revealed by the naming units of the pertinent data and (b) have bearing on the cognitive study of that aspect (see section 2.1.2. above). More specifically, cultural variables may affect either the number of sets that can be formed with the linguistic variables, or the inventories of these sets. The cultural variables, therefore, can be said to be associated with the linguistic variables in the two ways specified above, thus constituting two types. An instance of the first type is the case in which different sets of naming units are used depending on the sex of the speaker. An example of this is the use of different sets of kinship terms depending of the sex of the speaker, as is the case in many kinship terminologies. An instance of the second type of cultural variables is the case in which the inventory of a set of meaning units is restricted by the sex of the speaker. Thus, when referring to color terms, women in American culture are supposed to be able to use the full set whereas men use only a part of the set.

In addition to sex, the influence of which was exemplified above, role, class and regional differences are some other common cultural variables that are known to affect the linguistic variables. In the case of the cultural variables, therefore, the form-meaning covariance can be said to be characterized by the prominence of circumstantial conditions of variation.

The bearing of the distinction between linguistic and cultural variables on the cognitive study of language is that it provides an organizing principle for the observation of the meaning variants of the aspect of language under investigation. It is on the basis of such an observation that the semantic distinctive features of this aspect are inferred (see section 2.2.2. below).

2.1.2.2. Initial variables versus additional variables

The variables directly connected with the aspect of language under investigation constitute the initial variables. They allow one to form, with the naming units of the pertinent data, sets displaying contrasts between the various manifestations of the aspect of language under investigation (see Diagram I9).

The variables connected with the aspect of language under investigation through the initial variables constitute the additional variables. They allow one to form, with the naming units of the pertinent data, sets displaying contrasts between the initial variables (see Diagram I9).

The bearing of the distinction between initial and additional variables on the cognitive study of language is as follows: it provides the criterion for differentiation of the semantic distinctive features that characterize a given aspect of language into two types, namely, primary semantic distinctive features and secondary semantic distinctive features (see section 2.1.4.2.below). This, in turn, allows one to differentiate two modalities in the cognitive content of a given aspect of language, namely, basic cognitive content and ramifications of the cognitive content (see section 2.1.5. below).

2.1.3. Underlying concept

This is the concept assumed by the analyst to reflect the aspect of reality referred to by a given aspect of language.

In line with the commonly held assumption of the psychic unity of mankind, it is proposed that while each culture has its own way of viewing reality, there are certain characteristics of the real world for which there is a high likelihood that every culture has a linguistic means of expression.[29] These characteristics therefore, can be abstracted as *probable universals*. It is to these probable universals that underlying concepts are intended to refer. It is believed that, within this frame of reference, it is possible for an analyst to infer an underlying concept without imposing his own cultural bias on the data. In line with the above, the following distinction between underlying concept and cognitive content is proposed: An underlying concept is the probable universal concept assumed by the analyst to be manifested in a given aspect of language. The cognitive content of an aspect of language, on the other hand, is the analytic abstraction resulting from cognitive analysis that is regarded as the manifestation of a given underlying concept unique to the language-and-culture situational context under investigation.[29]

The underlying concept is a crucial analytic tool in the approach to the cognitive study of language proposed here. On the one hand, the underlying concept provides the link between the semantic domain and the cognitive domain of language, previously differentiated as one of the basic assumptions in this research (see section 1.1.1. above). On the other hand, the underlying concept provides a link not only between the various linguistic aspects that are included in a single cognitive problem area but also between the major facets of the same cognitive problem area and the linguistic aspects that correspond to each of these facets.

The underlying concept provides a link between the semantic domain and the cognitive domain by furnishing the means for inferring the cognitive content of a specified aspect of language from its semantic distinctive features. In other words, the underlying concept allows me to give the following operational definition of cognitive content: *The cognitive content of a given aspect of language is ascertained by relating the semantic distinctive features of that aspect to the underlying concept.*

The bearing of this definition of cognitive content on the cognitive study of language is as follows: the cognitive study of language can be said to consist in the uncovering of the cognitive system of a people through an investigation of the probable universal concepts manifested in their language.

The cognitive analysis of any given aspect of language includes, therefore, three main objectives: the postulation of the underlying concept manifested in that aspect; the uncovering of the semantic distinctive features of that aspect; the uncovering of the cognitive distinctive features constituting its cognitive content (see end of section 1.1.1. above).

The procedures proposed in the present approach in order to meet these three objectives, are described in detail in section 2.2. below. The relation between underlying concept, semantic distinctive features and cognitive content is shown schematically in Diagram I~~I~~I.

The underlying concept provides a link between different linguistic aspects by furnishing the criterion in terms of which the latter can be said to be cognitively related: several linguistic aspects that share the same underlying concept are said to be cognitively related and to belong to a single cognitive problem area (see section 2.1.6.1. below).

Finally, the underlying concept permits the differentiation of the major facets of a cognitive problem area by providing the core of the problem and, by implication, its secondary facets (see section 2.1.6.2.1. below). As a consequence, the underlying concept also provides the criterion for determining what aspect of the language corresponds to what facet of the cognitive problem area.

2.1.4. Semantic distinctive features

As stated in section 1.1.1. above the semantic distinctive features of a given aspect of language are the invariant characteristics of the meaning of that aspect as revealed by the naming units pertinent to its investigation.

Semantic distinctive features are differentiated on the basis of two criteria: (1) the aspect of language which they characterize, and (2) the aspect of language from which they are derived. These two criteria together serve to distinguish the _immediate_ semantic distinctive features from the _ancillary_ semantic distinctive features. In addition they serve to distinguish two types of immediate semantic distinctive features, namely _primary_ semantic distinctive features and _secondary_ semantic distinctive features.

The relation between the various types of semantic distinctive features is shown schematically on Diagram III.

The procedure for ascertaining semantic distinctive features is discussed in section 2. 2. 2. below.

2. 1. 4. 1. Immediate semantic distinctive features

The semantic distinctive features that are immediately relevant to the characterization of the aspect of language under investigation are the immediate semantic distinctive features. Those that are not immediately relevant to the characterization of the aspect of language under investigation are the ancillary semantic distinctive fatures.

The immediate semantic distinctive features characterize one linguistic aspect and are derived from another linguistic aspect. Immediate semantic distinctive features include those characterizing the aspect of language under investigation and derived from the initial variables, as well as those characterizing the initial variables and derived from the additional variables (see section 2. 1. 4. 2. below).

The ancillary semantic distinctive features characterize the variables from which they are derived.

The bearing of the distinction between immediate semantic distinctive features and ancillary semantic distinctive features is as follows: in some cases, the establishment of the ancillary semantic distinctive features is necessary in order to uncover the immediate semantic distinctive features (see section 4. 2. 2. 2. 1. 2. and 4. 2. 2. 2. 2. 2. below).

2.1.4.2. Primary semantic distinctive features versus secondary semantic distinctive features

The immediate semantic distinctive features ~~proper to the aspect of language under investigation~~ are derived by using the linguistic variables (and their associated cultural variables when present) as a frame of reference. They are derived from the variables either directly or through ancillary semantic distinctive features (see section 2.1.4.1. above).

Two basic types of immediate semantic distinctive features are distinguished on the basis of the variables from which they are derived. They are: primary semantic distinctive features and secondary semantic distinctive features.

Primary semantic distinctive features are those characterizing the aspect of language under investigation and derived from the initial variables, either directly or through ancillary semantic distinctive features (see Diagram I9).

Secondary semantic distinctive features are those characterizing the initial variables ~~aspect of language under investigation~~ and derived from the additional variables, either directly or through ancillary semantic distinctive features (see Diagram I9).

In line with the fact that the linguistic variables may be grammatical and/or lexical (see section 2.1.2.1. above), both the primary semantic distinctive features and the secondary semantic distinctive features may be grammatically-derived and/or lexically-derived.

The bearing of the distinction between primary and secondary semantic distinctive features on the cognitive study of language is as follows: it provides the criterion for differentiating two modalities in the cognitive content of a given aspect of language, the basic cognitive content and the ramifications of the cognitive content (see section 2.1.5. below).

2.1.5. Cognitive content: basic cognitive content versus ramifications of cognitive content

As stated in section 1.1.1. above, the cognitive content of a given aspect of language is the cognitive significance specific to that aspect. It is ascertained by relating the semantic distinctive features of the aspect of language under investigation to the underlying concept (see end of section 2.1.3. above).

Two major modalities and two minor modalities of cognitive content are distinguished on the basis of the type of semantic distinctive features from which they are inferred (see section 2.1.4.2. above). The two major modalities are: basic cognitive content and ramifications of the cognitive content. The two minor modalities are: grammatical ramifications of the cognitive content and lexical ramifications of the cognitive content.

The basic cognitive content is constituted by the relation of the primary semantic distinctive features to the underlying concept (see Diagram I). It reveals the cognitive significance central to a given aspect of language.

The ramifications of the cognitive content are constituted by the relation of the secondary semantic distinctive features, on the one hand, to the primary semantic distinctive features, on the other hand, to the underlying concept (see Diagram I). It reveals the cognitive significance of the relation between a given aspect of language and other aspects of that language.

The bearing of the distinction between basic cognitive content and ramifications of the cognitive content on the cognitive study of language is as follows: By including within the scope of the cognitive content of a given aspect of language the cognitive significance of the linguistic relation between that aspect and other aspects of that language, the present approach accounts for one basic structural property of language, namely, the fact that its various aspects are interrelated. It is through this interrelation that one can envisage the progressive uncovering of the whole cognitive system rather than merely of isolated manifestations of cognitive content (see section 5.3. below).

2.1.6. Cognitive problem area

Linguistic aspects that manifest the same underlying concept belong to the same cognitive problem area (see end of section 2.1.3. above).

This section discusses first the identification of a cognitive problem area through a given aspect of language considered for investigation, then, the subdivision of the cognitive problem area into its core and secondary facets.

2.1.6.1. Identification of cognitive problem area

This requires the following sequence of analytic operations. First, a linguistic aspect is selected for initial consideration. This consideration, in turn, leads to the postulation of the underlying concept manifested in that aspect (see section 2.2.1. below). Once the underlying concept can be stated, it becomes possible to ascertain what other linguistic aspects manifest the same underlying concept. It then becomes possible to identify the cognitive problem area in which these aspects participate. In line with the above, a given cognitive problem area is defined as consisting of the relation of the underlying concept to all the aspects of language that manifest it, and not merely to the aspect initially considered for investigation. The number of linguistic aspects making up a given cognitive problem area allows one to determine the scope of that cognitive problem area.

Examples of identification of cognitive problem areas are given in sections 3.1.1.2. and 4.2.1.1.2.below).

The relation between the aspect of language initially considered for investigation and the cognitive problem area is shown schematically in Diagram II.

The bearing of the notion of cognitive problem area on the cognitive study of language is as follows: It is assumed that the linguistic aspects that are included in the same cognitive problem area have related cognitive contents. It is further assumed that the comparison of related cognitive contents allows one to ascertain what theme is manifested by these cognitive contents (see Diagram II).

2.1.6.2. Subdivision of cognitive problem area

It is proposed that a cognitive problem area be subdivided on the basis of its major facets and the major details of each facet. The major facets of a cognitive problem area are its core and its secondary facets. These are discussed in section 2.1.6.2.1. below. The major details of each facet are differentiated in terms of two additional considerations discussed in section 2.1.6.2.2. below.

2.1.6.2.1. Core versus secondary facets

Like all complex problems a cognitive problem area can be expected to show some major patterns and some subpatterns. The subpatterns can be assumed to be modifications of the major patterns. They are therefore best understood in terms of the analysis of the latter. The major patterns are said to constitute the core of the problem, the subpatterns its secondary facets.

The subdivision of the cognitive problem area into its major facets is determined by the dependence of the secondary facets on the core; the investigation of the core should therefore precede that of the secondary facets.

The identification of the core and of the secondary facets is based on the underlying concept. The core of a cognitive problem area can be defined as follows: it is that facet of the cognitive problem area which concerns the major variations of the underlying concept as revealed by the linguistic system. For each cognitive problem area the core can be identified by answering the following two questions: what is the underlying concept, and what are its major manifestations?

The secondary facets can be identified by contrast with the core of the cognitive problem area. They are those variations of the underlying concept for the understanding of which the analysis of the core is a prerequisite.

Examples of identification of the core and the secondary facets of cognitive problem areas are presented in sections 3.1.1.3. and 4.2.1.1.3.below.[30]

2.1.6.2.2. Subdivision of core and secondary facets

A crucial consideration in subdividing the core of a problem area and its secondary facets is whether the linguistic aspect that corresponds to each major facet is pervasive or not. A given linguistic aspect is pervasive if it applies to the entire data base without exception. It has been observed that a pervasive linguistic aspect is gradual, i.e., it applies to different portions of the data in different degrees. A nonpervasive linguistic aspect, on the other hand, may or may not be gradual.

In the case of a nonpervasive linguistic aspect, it is assumed that its cognitive content is revealed both through the naming units in which it is present and through those in which, although relevant, it is absent or neutralized (e.g., gender in nonthird personal pronouns in English). The first type of naming units is said to be _positively relevant_ to the investigation of the cognitive content of a given linguistic aspect; the second type is said to be _negatively relevant_ to the investigation of that aspect.

The subdivision of the core and that of the secondary facets into their major details is determined by the dependence of the analysis of the negatively relevant naming units on that of the positively relevant ones: conditions of negative relevance can be ascertained only by contrast with conditions of positive relevance. Therefore the initial stage in the investigation of the core and that of the secondary facets should deal with the positively relevant naming units, the subsequent stages should deal with the negatively relevant naming units.

In the case of a pervasive linguistic aspect, the distinction is not one of positive versus negative relevance, but one of extreme versus nonextreme manifestation.

The subdivision of the core and that of the secondary facets into their major details is determined by the assumption that the nonextreme manifestations are more highly differentiated and therefore more likely to display a variety of contrasts than the extreme manifestations. Therefore, the initial stage in the investigation of the core and that of the secondary facets should deal with the nonextreme manifestations of the pervasive linguistic aspect.

Instances of subdivision of the core into its major details are given in section 3.1.1.2below.

The bearing of these distinctions (core versus secondary facets, initial stage versus subsequent stages in the investigation of the core and the secondary facets) on the cognitive study of language is as follows: They constitute the basis for a sequence of analytic stages that correspond to the order of complexity of the various facets of a given cognitive problem area. The purpose of this sequence of analytic stages is to ensure tractability by reducing the complexity of the data without distorting their nature.

The analytic stages proposed for the complete investigation of a given cognitive problem area correspond to the major details of each one of its facets. The sequence of these analytic stages is establised in terms of their logical order of priority. It is as follows: First is the analysis of the core. Within the core, either conditions of positive relevance should be examined before conditions of negative relevance, or nonextreme manifestations should be examined before extreme manifestations. This establishes the initial and subsequent stages in the investigation of the core. The analysis of the core is followed by the analysis of the secondary facets of the cognitive problem area. Within each of these, conditions of positive relevance should be examined before conditions of negative relevance, and nonextreme manifestations before extreme manifestations. This establishes the initial and subsequent stages in the investigation of the secondary facets. In line with the definition of each analytic stage, as specified above, it is possible to ascertain to what analytic stage any of the linguistic aspects that make up a given cognitive problem area belongs.

2.2. Individual procedures

As stated at the end of section 2.1.3. above, the cognitive analysis of any given aspect of language includes three main objectives: on the one hand, the postulation of the underlying concept; on the other hand, the inference of the semantic distinctive features of that aspect, as well as that of the cognitive distinctive features that constitute its cognitive content.

The individual procedures, proposed in the present approach in order to meet these objectives, will now be discussed in turn.

2.2.1. Procedure for the postulation of the underlying concept

If it is to reflect the aspect of reality referred to by the aspect of language under investigation (see section 2.1.3. above), it is believed that the underlying concept should account for *the total range of meaning variation* exhibited by that aspect, without taking into consideration contrasts formed by its meaning variants. The latter become of primary importance only when it comes to inferring the semantic distinctive features of the aspect of language under investigation.[31]

It is proposed, therefore, that the underlying concept should be postulated by the analyst on the basis of the total range of meaning variation of a given aspect of language as revealed by the naming units that are affected by it.

Thus, in one of the studies conducted in the course of this research, the aspect of language under investigation is the category of nominal number. The underlying concept is that of multiplicity. It is postulated on the basis of the range of meaning variation of the category of nominal number as revealed by the naming units of the pertinent data, i.e., the naming units that are the carriers of the category of nominal number. The meaning variants exhibited by these naming units all involve ways of viewing oneness as opposed to nononeness (see section 3.1.1.2. below).[32]

The major difficulty in postulating the underlying concept lies in meeting the requirement of probable universality: the postulated underlying concept should be abstract enough so as not to impose the analyst's cultural bias on the data. At this stage of the research, no criteria have been found to ensure the required level of abstraction and, therefore, the probable universality, of the postulated underlying concepts. One observation is worth noting however: in some cases the postulation of an underlying concept offers a greater difficulty than in other cases. A discussion of the relative ease or difficulty encountered in the course of this research is found in section 3.1.1.2. below.

2.2.2. Procedure for the inference of distinctive features, semantic and cognitive

Distinctive features are the analytic abstractions resulting directly or indirectly from the application of the basic method of qualitative contrasts described in section 2.1.1. above. In line with this method, distinctive features are inferred from the contrastive patterns exhibited by the data.

In the present approach the proposed way to proceed in order to infer distinctive features is as follows: The first objective is to interpret the contrastive patterns observed in the data, in terms abstract enough so as to account for all of these patterns. The analytic tool regarded as best suited for this purpose is the notion of opposition. The latter is defined as a relation of systematic differences between two or more terms. Such a notion allows one to subsume a wide range of variation under a single abstraction.

The contrastive patterns observed in the data should therefore be interpreted in terms of oppositions.

These oppositions are regarded as manifesting the distinctive features that participate in them. 33

The second objective is to determine how many distinctive features participate in each opposition. [illegible]

So far, no essential differences have been observed in the way to proceed in order to infer semantic distinctive features as opposed to cognitive distinctive features. It seems that the two types of distinctive features can be inferred by the application of the same general procedure.

The two objectives characterizing this procedure will now be discussed in turn.

2.2.2.1. Ascertaining the oppositions that manifest distinctive features.

As stated in section 2.2.2. above, the oppositions manifesting distinctive features - semantic and cognitive - are inferred from contrastive patterns observed in data.

In the course of this research two types of inferences have been observed to lead to the characterization of such oppositions: either first-order inferences or second-order inferences.

First-order inferences are those stemming directly from the observation of the data. Second-order inferences are those made from prior inferences. The way in which these two types of inferences are made will now be described in turn.

2.2.2.1.1. First-order inferences

These inferences result directly from the application of the method of qualitative contrasts. They are made as follows: the naming units of the pertinent data are grouped into sets and their meaning variants are inspected within the frame of these sets.

The qualitative contrasts displayed by these meaning variants reveal the contrastive patterns characterizing the aspect of language that is reflected in the naming units grouped into sets.

These contrastive patterns, in turn, allow one to infer the opposition - or oppositions - that manifests the semantic distinctive features of that aspect.

In the course of this research, first-order inferences have been observed to lead only to the characterization of oppositions manifesting semantic distinctive features, either those immediate ~~proper~~ to the aspect of language under investigation, or those ancillary with respect to that aspect.

An instance of first-order inferences yielding semantic distinctive features immediate ~~proper~~ to the aspect of language under investigation is described in section 3.2.1.3.1. below. An instance of first-order inferences yielding semantic distinctive features ancillary with respect to the aspect of language under investigation is described in section 4.2.2.2.1.2. below.

In addition, first-order inferences have been observed to yield semantic distinctive features — either ~~proper~~ immediate or ancillary— on the basis of two types of contrastive patterns exhibited by the naming units grouped into sets. The first type of contrastive patterns is as follows: With sets formed with the initial variables, each set contrasts as a whole with the other sets in terms of the initial variables. An instance of such sets leading to the inference of semantic distinctive features ~~proper~~ immediate to the aspect of language under investigation is described in section 3.2.1.3.1. below. An instance of such sets leading to the inference of ancillary semantic distinctive features is described in section 4.2.2.2.1.2. below.

The second type of contrastive patterns is as follows: With sets formed with the additional variables, within the same set individual units making up the set contrast with each other in terms of the initial variables. An instance of such sets leading to the inference of semantic distinctive features immediate ~~proper~~ to the aspect of language under investigation is described in section 3.2.3.2.2. below.

2.2.2.1.2. Second-order inferences

These inferences result indirectly from the application of the method of qualitative contrasts. They are made as follows: Contrastive patterns are revealed by relating the semantic distinctive features resulting from first-order inferences either to the aspect of language under investigation or to the underlying concept.

The contrastive patterns revealed by the relation of ancillary semantic distinctive features to the aspect of language under investigation allow to infer the opposition - or oppositions - manifesting the semantic distinctive features immediate ~~proper~~ to that aspect. An instance is described in section 4.2.2.2.1.3. below.

The contrastive patterns revealed by the relation of semantic distinctive features immediate ~~proper~~ to the aspect of language under investigation to the underlying concept allow one to infer the oppositions manifesting the cognitive distinctive features of that aspect. More specifically, on the one hand, the contrastive patterns revealed by the relation of the primary semantic distinctive features to the underlying concept allow one to infer the opposition — or oppositions — manifesting the cognitive distinctive features of the basic cognitive content of that aspect. An instance is described in section 3.2.1.4.1. below.

On the other hand, the contrastive patterns revealed by the relation of the primary semantic distinctive features to the secondary semantic distinctive features and to the underlying concept allow one to infer the opposition — or oppositions — manifesting the cognitive distinctive features of the ramifications of the cognitive content of the aspect of language under investigation. An instance is described in section 3.2.3.1.3. below.

2.2.2.2. Determining the number of distinctive features that participate in a given opposition

It is proposed that the number of distinctive features depends on the type of the opposition that manifests them.

In ascertaining the type of a given opposition two criteria are used: (1) the number of terms contained in a given opposition; (2) the relation obtaining between these terms.

The first criterion allows one to distinguish two major types of oppositions: oppositions containing two or more terms and oppositions containing only two terms.

Oppositions containing two or more terms are represented by a single type, namely, *equipollent oppositions*. Among the oppositions containing only two terms, on the other hand, two types are further distinguished on the basis of the second criterion. These are *gradual oppositions* and *privative oppositions*.[34]

The assignment of distinctive features to these three types of opposition will now be discussed in turn.

An equipollent opposition is one in which the terms correspond to logically unrelated characteristics. Consequently, as many distinctive features are assigned to any given equipollent opposition as there are terms in that opposition.

An instance of an equipollent opposition and the corresponding distinctive features is described in section 3.2.1.3.1.2. below.

A gradual opposition is one in which the two terms correspond to two opposite characteristics that manifest themselves in varying degrees. Since two characteristics are postulated, two distinctive features are assigned to each gradual opposition. The two opposite characteristics are said to constitute a pair of distinctive features. An instance of a gradual opposition and of the two corresponding distinctive features is described in section 3.2.1.4.1. below.

A privative opposition is one in which one of the two terms corresponds to the presence of a given characteristic while the other term corresponds to its absence. The former is called the marked term; the latter is called the unmarked term. A privative opposition is characterized by the fact that it can be neutralized. Under conditions of neutralization, the opposition is represented by its unmarked term. The possibility of neutralization is, therefore, an operational criterion for a privative opposition.[35]

← In this approach two types of privative oppositions are distinguished. These are qualified privative oppositions and unqualified privative oppositions.

A qualified privative opposition is one in which the presence and/or the absence of the mark (i.e. a given characteristic) is in some way qualified. An instance in which the presence of a given characteristic is qualified is discussed at the end of section 4.2.2.2.1.2. below: the characteristic is either unconditionally present or conditionally present.

An unqualified privative opposition is one in which neither the presence nor the absence of the mark is qualified. Since in the case of either a qualified privative opposition or an unqualified one, a single characteristic is postulated, only one distinctive feature is assigned to any given privative opposition.

An instance of a qualified privative opposition with its accompanying distinctive feature is discussed in section 4.2.2.2.1.2. below.

An instance of an unqualified privative opposition with its accompaning distinctive feature is discussed in section 3.2.3.1.2.2 below.

2.3. Step sequence

As stated previously (see section 2.1.3.) the cognitive content of a given aspect of language is ascertained by relating the semantic distinctive features of that aspect to the underlying concept. In line with the above, the order in which the three main objectives in the cognitive analysis of any given aspect of language should be approached is as follows: the first objective is the postulation of the underlying concept manifested in that aspect; the second objective is the inference of its semantic distinctive features; the third objective is the inference of the cognitive distinctive features that constitute its cognitive content.

In the course of this research it was observed that the more the approach to cognitive analysis was refined, the more the series of tasks required to meet the three objectives listed above became complex. It was therefore felt necessary to specify a logical sequence not only for the three main objectives, but also for the various tasks required to meet each of them.

The sequence proposed in this approach consists of four analytic steps grouped into two major phases: the specification phase and the analysis phase. The specification phase includes the first two steps and aims at a detailed formulation of the cognitive problem area and of the data pertinent to its investigation.

The analysis phase includes the last two steps and deals with the actual analysis. The sequence of analytic steps specified above is called the step sequence.

Once conceived, the step sequence was ~~devised and~~ refined in two stages of development. The version corresponding to the first stage of development is called the initial step sequence. The second version is called the revised step sequence.

The following sections include an account of (a) how the initial step sequence was established and later developed into the revised version; (b) the reasons for this further development and (c) the criteria for assessing the generality of the revised step sequence.

A detailed discussion of the tasks pertaining to each step of the revised step sequence is given in section 3 below.

An account of how the revised step sequence was tested appears in section 4 below.

2.3.1. Individual investigations that led to step sequence

The present approach to cognitive analysis is based on the investigation of three widely different aspects of a single language, namely, Papago.

As further insight was gained in the course of the research, each aspect was reexamined. This led to the improvement, not only of the general approach, but also of the results obtained in the case of each individual investigation.

The first effort towards the development of this approach to cognitive research in ethnolinguistics dealt with the category of nominal number. It constitutes an individual investigation called the Pilot Study.[36] The overall approach followed in the Pilot Study was then applied to another aspect of language, namely, the property of grammatical and lexical fusion. This constitutes a second individual investigation called the initial version of the Case Study. The above two individual investigations served to establish the initial step sequence. The generality of the initial step sequence was then tested by applying it to an additional linguistic aspect, namely, the category of person. This constitutes a third individual investigation called the initial version of the Test Case.

The insight gained in the course of this third investigation led to the reexamination of the linguistic aspects covered in the two previous investigations (i.e., the category of nominal number and the property of grammatical and lexical fusion). This reexamination resulted in a revision of these studies called the *Follow-up Study* and the *revised version of the Case Study*, respectively.

The revisions of the overall approach effected in the course of this reexamination led to the *revised step sequence*. The generality of the revised step sequence was then tested by reexamining the linguistic aspect investigated in the initial version of the Test Case. This reexamination resulted in a revision of this study called the *revised version of the Test Case*.

This latter investigation led to a further development of the conceptual framework discussed in section *4.1.* below.

This further conceptual development could be integrated in the revised step sequence without requiring major changes. The generality of the revised step sequence was thereby increased without affecting its previous application to the Follow-up Study and the revised version of the Case Study. These two studies, therefore, required no further revisions.

The relation between the two versions of the step sequence and the individual investigations that led to them is shown schematically in Diagram III.

In the present monograph only the revised versions of the three individual investigations are described in detail. These are the Follow-Up Study, the revised version of the Case Study and the revised version of the Test Case. Whenever the initial versions differ significantly from the revised ones, this is indicated in a footnote.

The application of the initial step sequence in the Pilot Study and the initial version of the Case Study is shown on Table I. Its testing in the initial version of the Test Case is shown on Table III.

The application of the revised step sequence in the Follow-up Study and the revised version of the Case Study is shown on Table II. Its testing in the revised version of the Test Case is shown on Table IV.

2.3.2. Revision of initial step sequence

In the course of applying the initial step sequence to the facet of the problem area of the Test Case and of reexamining the linguistic aspects investigated in both the Pilot Study and the Case Study, some flaws in the conceptual ⟶

framework that formed the basis for that version of the step sequence, became apparent. These flaws all stemmed from a lack of explicitness in the conception of some of the analytic tools. This lack of explicitness was reflected in two aspects of the initial step sequence: the relation between some of the individual steps; the tasks included in some of the individual steps.

As these flaws were uncovered, the initial step sequence was revised in order to eliminate them.[37] These revisions will now be discussed.

2.3.2.1. Revisions affecting the relation between some of the individual steps

The need for these revisions resulted from a major flaw in the conceptual framework: The latter lacked a clear-cut distinction between the semantic domain and the cognitive domain of language. Consequently there was no operational definition of cognitive content (see section 2.1.3. above). It was not clear how, and in what step -- or steps --, the cognitive content was to be inferred from the data.

The initial step sequence was essentially based on a technique of directed trial and error. While there was a definite order in which particular factors were to be considered, the relation between different sources of information and expected results was not yet understood and consequently it could not be specified. In other words, the relation of initial variables and additional variables to the expected results was not clear.

It is insight gained regarding this relation that led to the revision of the initial step sequence. In the revised step sequence there is a necessary relation between initial variables, additional variables and expected results: the initial variables are expected to yield one aspect of the cognitive content, namely, the basic cognitive content; the additional variables are expected to yield another aspect of the cognitive content, namely, the ramifications of the cognitive content. Consequently, the role of the two types of variables in the analysis of a given aspect of language is parallel. The step — or steps — dealing with them should, therefore, be structured similarly.

In the initial step sequence two of the proposed steps dealt with the initial variables while only one step dealt with the additional variables. The former are step 3 and step 4, the latter is step 5 (see Tables I and III).

In line with the argument presented above, in the revised step sequence both types of variables are handled by a single step each. Step 3 and step 4 of the initial step sequence are pulled together as step 3, and step 5 of the initial step sequence becomes step 4 (see Tables II and IV).

2.3.2.2. Revisions affecting the tasks included in some of the individual steps

The lack of explicitness in the conception of some of the analytic tools affected the formulation of the tasks included, on the one hand, in step 1, on the other hand, in both steps 3 and 4 and step 5 of the initial step sequence (i.e., step 3 and step 4 of the revised step sequence).

In step 1, the task consists in formulating a problem area. In the absence of the notion of underlying concept (see section 2.1.3. above), the way to proceed in order to formulate the problem area was not clearly specified: The instruction was merely to formulate it in as general terms as possible. Once the notion of underlying concept was introduced and defined operationally, the problem area could be specified as consisting of the relation between the underlying concept and all the linguistic aspects that manifest it (see section 2.1.3. above). As a consequence, the general task of formulating the problem area had to be broken down into a number of specific tasks. These are the following: The first task consists in selecting an aspect of language to be considered for investigation. The second task consists in postulating the underlying concept. The third task consists in specifying the cognitive problem area (i.e., deliminating its scope and determining its facets). The fourth, and last, task consists in ascertaining whether the aspect of language initially considered for investigation coincides with the core of the cognitive problem area.

The four specific tasks detailed above were integrated into step 1 of the revised step sequence.

In both steps 3 and 4 and in step 5 of the initial step sequence (i.e., both step 3 and step 4 of the revised step sequence), the initial task consists in assembling sets of pertinent naming units using specified variables as a frame of reference. The subsequent tasks aim at uncovering the cognitive content of the aspect of language under investigation that is revealed by the variables. In order to perform these tasks, it was found necessary to specify further, on the one hand, the definitions of some of the variables, on the other hand, the procedure for inferring the cognitive content.

The classification of the variables includes two basic distinctions: initial variables versus additional variables, and linguistic variables versus cultural variables. The latter distinction was found to be operationally adequate. It was therefore retained.[38] The distinction between initial variables, on the other hand, required some revision.

Initial variables were first differentiated from additional variables as follows: Initial variables were defined as the variables most immediately connected to the aspect of language under investigation; additional variables, were defined as the variables less immediately connected to that aspect.

The way to proceed in order to ascertain closeness or distance between given variables and the aspect of language under investigation was left unspecified. The attempt to specify the closeness of the initial variables to the aspect of language under investigation as opposed to the distance of the additional variables from that aspect, resulted in the following operational definitions: Initial variables allow one to assemble sets of pertinent naming units displaying contrasts between the manifestations of the aspect of language under investigation.

Additional variables allow to assemble sets of pertinent naming units displaying contrasts between the initial variables. These operational definitions are utilized in performing the initial task of both step 3 and step 4 of the revised step sequence.

In view of the absence of an operational definition of cognitive content, the instructions accompanying the tasks aiming at uncovering it, in the initial step sequence, required to be further specified.

It was initially thought that the cognitive content could be inferred directly from an examination of the contrastive patterns displayed in the sets formed with the variables. As a consequence, no distinction was made between, on the one hand, cognitive content and cognitive distinctive features, on the other hand, semantic distinctive features and cognitive distinctive features.

With the introduction of these further distinctions, two changes affecting the tasks included in some individual steps became necessary.

The first change consisted in increasing the number of the tasks included both in step 4 and in step 5 of the initial step sequence (i.e. step 3 and step 4 of the revised step sequence) so as to allow the uncovering of semantic distinctive features before that of cognitive distinctive features.

The second change consisted in specifying how the number of distinctive features — semantic and cognitive — was to be ascertained. The procedure described in detail in section 2.2.2. above is an attempt to systematize the process of inferring distinctive features from the contrastive patterns observed in the data. These two changes were integrated into the revised step sequence.

2.3.3. Generality of Step Sequence

The step sequence is central to the present approach. It purports to be a precise guide for the uncovering of the cognitive significance of any given aspect of language. In order to meet this goal it is essential that the step sequence should have a high degree of generality.

Two requirements are thought to insure the generality of the step sequence: it should apply to a diversity of linguistic aspects; it should apply to the different facets of the same cognitive problem area. These two requirements will now be discussed in turn.

2.3.3.1. Applicability to diversity of linguistic aspects

The purpose of the Test Case is to investigate whether the step sequence meets the first requirement, i.e., whether it can be repeated to deal with a new and different linguistic aspect.

→ By different is meant here a difference in terms of the application of the step sequence to a linguistic aspect.

Originally, the only difference between linguistic aspects that suggested itself was one having to do with their nature, namely, that between a category and a property (see section 1.1.2.1. above). The assumption was that the nature of a given linguistic aspect might determine the application of the step sequence. In line with this assumption, the first investigation dealt with a category (that of nominal number), the second investigation dealt with a property (that of grammatical and lexical fusion). The linguistic aspect investigated in the Test Case being a category (that of person), no essential differences were expected to emerge in the application of the step sequence to this new linguistic aspect. The assumption governing the choice of the three linguistic aspects mentioned above, turned out to be mistaken. On the one hand, the application of the step sequence to the investigation of the category of nominal number and of the property of grammatical and lexical fusion proved to be identical. On the other hand, the application of the step sequence to the investigation of the category of person revealed an essential difference between that linguistic aspect and the two previous ones.

This difference in the application of the step sequence is interpreted as a consequence of the difference in the relation of the data to the aspect of language under investigation (see section 3.1.1.5.2. below) rather than of the difference in the nature of that aspect.

The relation of the data to the aspect of language under investigation is the same in the case of the category of nominal number and in that of the property of fusion: the naming units of the pertinent data are the carriers of the aspect of language under investigation. This relation is different in the case of the category of person: the naming units of the pertinent data are not the carriers of the aspect of language under investigation.

The differentiation of linguistic aspects according to the two types discussed above is considered basic. The revised version of the step sequence appears to be applicable to both types. It remains to be ascertained whether there are further types of linguistic aspects and whether the revised step sequence is equally applicable to them.[39]

2.3.3.2. Applicability to the different facets of the same cognitive problem area: Iteration of individual steps

The second requirement to insure the generality of the step sequence is that it can apply to the different facets of the same problem area (see section 2.1.6.2. above). It is proposed that the specification of the sequence of analytic stages appropriate to the investigation of a complete cognitive problem area belongs, with its formulation, to the first step of the revised step sequence. The first step, therefore, is restricted to the initial approach to a given problem. It is carried out only once. The remainder of the revised step sequence, which includes steps 2,3 and 4, is iterative: It is assumed that it can be repeated for each of the analytic stages established for a given problem. This, however, has not yet been tested since the three investigations conducted so far deal only with the same facet of each problem.

In addition, in the case of several unrelated variables of the same order -- i.e., initial and/or additional variables -- (see section 4.1.1. below), the sequence of tasks included in step 3 and/or step 4 is iterative: This sequence is repeated for each one of the unrelated linguistic variables. The revised version of the Test Case offers an instance of the iteration of the tasks included in step 3 (see section 4.2.2.1. below).

3. Description of individual steps of revised step sequence

In the following sections an attempt is made to specify the tasks pertaining to each step of the revised step sequence and to give the rationale for their requirements. The steps belonging to the two phases, specification and analysis, are discussed individually in sections 3.1. and 3.2. below, together with their application in both the Follow-Up Study and the revised version of the Case Study. Whenever possible, the discussion of a given task in both studies is followed by a substantive characterization of the conceptual tools used in accomplishing that task.

The revised step sequence, as applied both in the Follow-Up Study and in the revised version of the Case Study is shown schematically in Table II.

The application of the approach to the cognitive analysis of language proposed here to the Follow-Up Study is shown schematically in Diagram IV.

The application of this approach to the revised version of the Case Study is shown schematically in Diagram V.

3.1. Specification phase

As stated previously, the specification phase consists of two steps: step 1 aims at formulating the cognitive problem area; step 2 aims at specifying the data pertinent to the investigation of each one of its facets.

3.1.1. Step 1: Formulating the cognitive problem area

In line with the definition of cognitive problem area given in sections 2.1.6. above, this step involves four tasks.

The first task consists in selecting a linguistic aspect to be considered for investigation. The second task consists in postulating the underlying concept manifested by that aspect. The third task consists in specifying the cognitive problem area of which the linguistic aspect initially considered for investigation is a part.

The fourth, and last, task consists in ascertaining whether the linguistic aspect initially considered for investigation coincides with the core of the problem area.[40] These four tasks will now be discussed in turn.

3.1.1.1 Selecting the linguistic aspect to be considered for investigation

The aim is to select a linguistic aspect that has a high probability of being part of a productive problem area. The productivity of a problem area is gauged in terms of the likelihood that it will lead to one, or several, important theme(s) of the language.

It is believed that linguistic aspects most likely to be part of a productive problem area, in the above sense, are those that are highly recurrent. This belief is based on the common-sense assumption that the higher the recurrence of a pattern, the more likely it is to occupy an important place in the system in which it participates. Within the frame of reference of this study, this means that the higher the recurrence of a linguistic category or property, the more likely it is to be part of a cognitive problem area that will lead to one, or several, central theme(s) of the language.

The category of nominal number in the Follow-up Study and the property of grammatical and lexical fusion in the revised version of the Case Study were both selected in view of their high recurrence.

The category of nominal number in Papago is formally marked by a morphenic process of reduplication and includes three members: *singular*, *plural* and *distributive*. These three members apply to naming units either individually or in various combinations. The form of a naming unit which corresponds either to the singular only, or to the singular together with the plural, is called the *citation form*. The forms of a naming unit which correspond either to the plural and the distributive separately, or to the plural together with the distributive, are called the *derived forms*. The citation form of a naming unit may or may not be reduplicated. In either case it contrasts with the derived form(s) which are necessarily reduplicated. Thus, if the citation form is reduplicated, the derived form is reduplicated again, but in a different way.[41]

The property of grammatical and lexical fusion is very likely a universal property. It is the property which accounts for the integration of linguistic units of a lower order of complexity into units of a higher order of complexity.[42]

In addition, the property of grammatical and lexical fusion is pervasive: it applies to every naming unit without exception (see section 2.1.6.2.2. above). As a consequence, it is also gradual: it has extreme manifestations and non extreme manifestations.

The various degrees of grammatical and lexical fusion that apply to Papago naming units are said to constitute their fusional status. Both the extreme and non extreme manifestations of the property of fusion constitute the aspect of language initially considered for investigation in the revised version of the Case Study.

The category of nominal number is part of a cognitive problem area that appears to be extremely productive. The cognitive content revealed by the Follow-up Study suggests a theme of compactness — lack-of-compactness that is very likely central to the theme structure of the language (see section 5.3. below).

As far as the property of fusion is concerned, on the other hand, it is difficult, at this stage, to delimit the cognitive problem area of which it is a part. The cognitive content that emerged in the revised version of the Case Study appears to relate to universal cognitive characteristics rather than to any specific Papago theme (see section 3.2.4.3. below).

This raises two questions: Can cognitive characteristics specific to the Papago language-and-culture situational context be inferred from a universal property? Is the cognitive significance of linguistic properties comparable to that of linguistic categories? Neither of these two questions can be answered at this stage of the research.

3.1.1.2. Postulating the underlying concept

The task of postulating the underlying concept manifested in the linguistic aspect initially considered for investigation is carried out by applying the procedure described in detail in section 2.2.1. above.

The difficulty in applying this procedure depends on the extent to which the meaning variation of that linguistic aspect, as displayed by the naming units that are affected by it, can be made explicit.

In the Follow-up Study, the meaning variants corresponding to the three members of the category of nominal number include such clear-cut contrasts as "a single chair" versus "several chairs in several location" versus "several chairs in several locations" (see footnote 41). It was therefore easy to postulate the underlying concept of the category of nominal number as being one of *multiplicity*.

In the revised version of the Case Study, on the other hand, the meaning variants associated with the various manifestations of the property of grammatical and lexical fusion are of a more abstract nature, as well as much less familiar, than their counterparts in the Follow-up Study. These meaning variants seem to involve the measure of uniqueness that is attributed to given entities by the members of a culture. After much gro~~u~~ping, the underlying concept of the property of grammatical and lexical fusion was postulated as being one of *individualness*.[43]

← The hypothesis is that to a certain degree of fusion, grammatical or lexical, there corresponds a certain degree of individualness.[44]

3.1.1.3. Specifying the cognitive problem area

The task of specifying the cognitive problem of which the linguistic aspect initially considered for investigation is a part, is dual. It consists, first, in delimiting the scope of the problem area, then, in determing its different facets, as well as the corresponding sequence of analytic stages.

3.1.1.3.1. Delimiting the scope of the cognitive problem area

An entire cognitive problem area is defined as consisting of the relation of a given underlying concept to all the linguistic aspects that manifest it (see section 2.1.6.1. above).

In line with this definition, the underlying concept manifested in the linguistic aspect initially considered for investigation can serve to delimit the scope of the cognitive problem area of which that aspect is a part: all the linguistic aspects that share that underlying concept are within the scope of the same cognitive problem area.[45]

In the case of the first two studies conducted in the course of this research, the instructions for delimiting the cognitive problem areas apply as follows: The underlying concept manifested in the category of nominal number is that of multiplicity.

All the linguistic aspects that manifest the concept of multiplicity enter, therefore, into the same cognitive problem area. The latter is called the *cognitive problem of multiplicity.* The linguistic aspects that enter into this problem area include, in addition to the category of nominal number, the category of pronominal number (see section 4.2.2.1.1.1. below), the category of adjectival/adverbial number, and several categories of verbal number.[46] The scope of the cognitive problem of multiplicity is extremely wide since it covers the main word classes in the Papago linguistic system. It is shown in *Diagram VII*.

The underlying concept manifested in the property of grammatical and lexical fusion is that of individualness. All the linguistic aspects that manifest the concept of individualness enter, therefore, into the same cognitive problem area. The latter is called the *cognitive problem of individualness.* So far, no linguistic aspect suggests itself outside of the property of fusion. The scope of the cognitive problem of individualness is, therefore, very likely quite narrow. It is shown in *Diagram VIII*.

3.1.1.3.2. Determining the facets of the cognitive problem area and the corresponding sequence of analytic stages.

The instructions to follow in order to accomplish this task are described in detail in sections 2.1.6.2.1. and 2.1.6.2.2. above.

The application of these instructions to the first two cognitive problem areas dealt with in this research results in the following specification: The core of the cognitive problem of multiplicity is constituted by the major variations of the concept of multiplicity as exhibited by the category of nominal number. Its secondary aspects are constituted by the other categories of number (see section 3.1.1.3.1. above). The latter can best be understood in terms of the analysis of the nominal pattern. Since nominal number is a nonpervasive category, the initial stage in the investigation of the core deals with the conditions of positive relevance of this category. It reveals the cognitive significance of the presence of the category of nominal number.

A subsequent stage in the analysis of the core will deal with the conditions of negative relevance of the category of nominal number. It will reveal the cognitive significance of the absence of that category.

It seems that the cognitive problem of individualness includes a single linguistic aspect, namely the property of fusion. This is interpreted to mean that it has only a core and does not have secondary aspects.

Since fusion is a pervasive property, the initial stage in the investigation of the core deals with the nonextreme (i.e., both non-maximal and nonminimal) degrees of grammatical and lexical fusion. A subsequent stage in the investigation of the core will deal with the extreme (i.e. both maximal and miniminal) degrees of fusion.

3.1.1.4. Ascertaining whether the linguistic aspect initially considered for investigation coincides with the core of the problem area

This is the last task in step 1. Its aim and that of the first task complement each other. The aim of the first task is to ensure the selection of a productive problem area. The aim of the last task is to ensure the best entry into the investigation of a given problem area.

In line with the above, if the linguistic aspect initially considered for investigation does not coincide with the core, it is relegated to a later appropriate analytic stage. Another linguistic aspect that does coincide with the core, is selected for immediate investigation.

In the Follow-Up Study, the linguistic aspect initially considered for investigation is the category of nominal number. This category does coincide with the core of the cognitive problem of multiplicity to which it belongs. The category of nominal number is, therefore, retained for immediate investigation (see Table II).

In the revised version of the Case Study the linguistic aspect initially considered for investigation is constituted by the various manifestations (extreme as well as nonextreme) of the property of fusion. Only some of these manifestations, namely the nonextreme ones, do coincide with the core of the cognitive problem of individualness to which they belong. The extreme manifestations of the property of fusion pertain to the secondary facets of this cognitive problem area. Only the nonextreme manifestations of the category of fusion, therefore, are retained for immediate investigation (see Table II).

3.1.1.5. General characteristics of cognitive problem areas

In view of the methodological emphasis of the present approach, only the characteristics of cognitive problem areas that have a bearing on the application of the step sequence to their investigation will be discussed here. Two such characteristics have suggested themselves so far: (1) the scope of a given cognitive problem area; (2) the types of the linguistic aspects that enter into it.

3.1.1.5.1. Scope of cognitive problem areas

As can be seen from the delimitation of two cognitive problem areas in section 3.1.1.3.1. above, their respective scopes are greatly different. The scope of the cognitive problem area of multiplicity is considered to be extremely wide, whereas that of the cognitive problem area of individualness appears to be very narrow.

→ To the difference in their respective scopes there corresponds the following difference in the application of the step sequence to their investigation: the wider the scope of a cognitive problem area, the more often is the iterative part of the step sequence repeated (see section 2.3.3.2. above).

3.1.1.5.2. Types of linguistic aspects entering into cognitive problem areas

Two main types of such linguistic aspects can be distinguished so far: The first main type includes linguistic aspects that entail differences either in the list, or the sequence, of tasks pertaining to the step sequence. These linguistic aspects are regarded as basically different.

The second main type includes linguistic aspects that entail differences only in the details of the performance of certain individual tasks specified in the step sequence. These linguistic aspects are regarded as basically similar.

Two types of basically different linguistic aspects have already been proposed (see section 2.3.3.1. above). Basic type 1 includes linguistic aspects in which the naming units of the pertinent data are the carriers of the aspect of language under investigation. Basic type 2 includes linguistic aspects in which the naming units of the pertinent data are not the carriers of the aspect of language under investigation.

Two types of differences have been observed in the basically similar linguistic aspects investigated in the Follow-up Study and the revised version of the Case Study, respectively. These differences are: (1) differences in terms of the relevance of the two dimensions of the linguistic system, the grammatical and the lexical; (2) differences in terms of what are here considered two fundamental properties of structural units, namely their external functioning and internal structure.[47]

In the Follow-up Study, the cognitive problem of multiplicity is investigated through an examination of the various ways in which the category of nominal number[48] applies to certain naming units, namely those that refer to "quantifiable" entities (see section 3.1.2.1. below).

For the cognitive analysis of the category of nominal number in terms of the approach proposed here, only the grammatical dimension is considered directly relevant. The lexical dimension is therefore not taken into account. In addition, although the category of nominal number is one which in Papago involves grammatical internal structure[49] as well as grammatical external functioning, only the latter is dealt with in the Follow-up Study. The bearing on the cognitive content of the category of nominal number, of the grammatical internal structure of the pertinent naming units is excluded from consideration by holding the latter constant. This is achieved by limiting the naming units making up the pertinent data to a single type, namely single-base nouns.[50] The problem of the Papago concept of multiplicity is therefore explored only in terms of the grammatical external functioning of those pertinent naming units that exhibit a single type of internal structure.

In the revised version of the Case Study, the cognitive problem of individualness is investigated by considering the internal structure (grammatical and lexical) of naming units. Their external functioning not being directly relevant, is not taken into account.

3.1.2. Step 2: Specifying the pertinent data

In line with the definitions of pertinent data versus universe of data given in section 2.1.1.2. above, this step involves a dual task. The latter consists (a) in determining what portion of the universe of data is directly pertinent to a given analytic stage in the investigation of a cognitive problem area, and (b) in selecting a sample of these data.

3.1.2.1. Determining the pertinent data for each analytic stage

The portion of the data base that is pertinent to the complete investigation of a given cognitive problem area is the universe of data (see section 2.1.1.2. above). To each of the analytic stages in the investigation of this cognitive problem area there corresponds a portion of the universe of data that is directly pertinent to that stage. This is the pertinent data. The pertinent data, therefore, may include a portion of the universe of data directly pertinent to the investigation of either the core (initial or subsequent stage) or of the secondary facets (initial or subsequent stage).

In the Follow-Up Study, the pertinent data are those corresponding to the initial stage in the investigation of the core. They are specified as follows: they include only those naming units (a) in which the category of nominal number is present, i.e., naming units that refer to "quantifiable" entities (see sections 2.1.6.2.2. and 3.1.1.3.2. above), and (b) which have an identical grammatical internal structure, i.e., which are constituted by one noun each (see section 3.1.1.5.2. above).

In the revised version of the Case Study, the pertinent data are also those corresponding to the initial stage in the investigation of the core. They are specified as follows: they include those naming units which (a) are multibase units (i.e. contain more than one base or stem) and (b) exhibit non-extreme fusional statuses.

3.1.2.2. Selecting a sample of the pertinent data

Although much reduced as compared to the entire universe of data, the size of the pertinent data for any given analytic stage in the investigation of a problem area is still too large to be tractable. It is proposed to reduce its size further by sampling it randomly. By random sampling is meant taking those naming units pertaining to a given stage which happen to be available in one's field notes. The assumption is that any portion of the pertinent data should be equally appropriate to serve as a sample.

In the Follow-Up Study, the sample of the pertinent data is constituted by names of animals, plants and things (see Table II). In the revised version of the Case Study, a subset of kinship terms and various pairs of naming units serve to illustrate the statements (see Table II).

3.1.2.3. General characteristics of pertinent data

The general characteristics of the pertinent data that suggest themselves so far involve the relation of the pertinent data to the carriers of the aspect of language under investigation (see section 2.1.1.1. above). Differences in this relation allow to distinguish two main conditions of pertinence. The first condition characterizes naming units which are themselves the carriers of the linguistic aspect under investigation.[51] The second condition characterizes naming units which are not themselves the carriers of the linguistic aspect under investigation but are in some systematic relation with the carriers of this aspect.

The first condition of pertinence includes carriers of a linguistic aspect, either grammatical or lexical.

In the Follow-up Study, the naming units of the pertinent data are the carriers of the category of nominal number, a grammatical category. In the revised version of the Case Study, they are the carriers of various non-extreme manifestations of grammatical and lexical fusion.

The second condition of pertinence includes any type of systematic relation between naming units and the carriers of the linguistic aspect under investigation. So far, three types of relation have been identified: co-occurrence, replacement, opposition.

A relation of cooccurrence is that between a linguistic aspect and the anming units that cooccur with its carriers. Thus, the lexical category constituted by the verbs of position, mentioned in section 1.1.2.3. above, can be investigated through the naming units which cooccur as subjects with the carriers of the category, namely, each of the verbs of position.

A relation of replacement is that between a linguistic aspect and the naming units that either serve to replace its carriers or are replaceable by them. An example is the case of the gender category in the personal pronouns of English (he, she, it). A Papago example is discussed in detail in sections 4.2. below.

Both the relation of cooccurrence and the relation of replacement allow the study of linguistic aspects which have only a few carriers (e.g., the category of person in pronouns).

A relation of opposition is that between a linguistic aspect and the naming units that are opposed to its carriers by virtue of not being affected by that category. Such naming units are the negatively relevant units mentioned in section 2.1.6.2.2. above. They are relevant to the investigation of the cognitive content of the linguistic aspect with which they are in a relation of opposition: they reveal the cognitive significance of the conditions under which the linguistic aspect does not apply.

3.2. Analysis Phase

The second phase, the analysis phase, is concerned with the uncovering of the cognitive content of the linguistic aspect under investigation. It consists of two steps: step 3 aims at uncovering the basic cognitive content; step 4 aims at uncovering the ramifications of the cognitive content (see section 2.1.5. above).

3.2.1. Step 3: Uncovering the basic cognitive content

This step involves three main tasks. The first task consists in identifying the initial variables, both linguistic and cultural.

The second task consists in ascertaining the primary semantic distinctive features of the aspect of language under investigation.

The third, and last, task consists in ascertaining the basic cognitive content of that aspect.

These three main tasks are carried out separately and sequentially. They constitute one of the iterative sequence of tasks mentioned in section 2.3.3.2. above. They will now be discussed in turn.

3.2.1.1. Identifying the initial linguistic variables

In line with the definition of initial linguistic variables given in section 2.1.2.2. above, the task of identifying these variables is dual. It consists (a) in ascertaining the initial linguistic conditions of variation and (b) in determining whether they are pertinent to the investigation.

3.2.1.1. Ascertaining the linguistic conditions of variation

This task consists in ascertaining whether the naming units of the pertinent data are affected by linguistic conditions of variation that reveal contrasts between the various manifestations of the aspect of language under investigation (see section 2.1.2.2. above). The latter conditions of variation constitute the initial linguistic conditions of variation. They may be grammatical and/or lexical. Whenever both types are present, grammatical conditions are listed before lexical ones.

Initial linguistic conditions of variation are ascertained on the basis of the form-meaning covariance of the naming units of the pertinent data (see section 1.1.2.2. above). In the Follow-up Study and in the revised version of the Case Study, this is done as follows:

In the Follow-Up Study the naming units of the pertinent data refer to "quantifiable" entities (see section 3.1.2.1. above). In line with the above, they are called *quantifiable naming units*.

← Quantifiable naming units are the carriers of the aspect of language under investigation, namely, the category of nominal number. They are differentially affected by this category. This is evidenced by their cooccurrence pattern with certain quantifying elements chosen for their diagnostic function. The latter include two particles and one verb. The two particles are *ha* "some, a little" and *haʔi* "some, a few"; the verb is *smuʔij* "there is a lot of". Thus, "a few chairs" is either *haʔi dadaikuḍ* if the chairs are in one location, or *haʔi daddaikuḍ* if the chairs are in several locations; "a little bit of flour" is either *ha cuʔi* if it is in a single container, or *ha cucuʔi* if it is in several containers; "there is a lot of saguaro cacti" is either *smuʔij g haaxañ*, if the cacti are in one location, or *smuʔij g hahaxañ*, if the cacti are in several locations.

The cooccurrence patterns of the citation form, or derived forms, of the pertinent naming units (see section 3.1.1.1. above) with the quantifying elements yield four diagnostic frames. These are:

frame 1	*ha* "some, a little"	citation form of noun
frame 2	*ha?i* "some, a few"	citation form of noun
frame 3	*ha?i* "some, a few"	derived form of noun
frame 4	*smu?ij* "there is a lot of"	citation form of noun

These frames are utilized for defining the various subclass memberships of the nouns that make up the pertinent naming units. They also serve, therefore, to define the respective statuses of the pertinent naming units.

The four diagnostic frames allow to distinguish four noun subclasses. These are: mass, aggregate, individual and mixed nouns. These noun subclasses are defined as follows:

Mass nouns fit frame 1 only. Aggregate nouns fit frame 2 only. Individual nouns fit frame 3 only. Mixed nouns fit either frame 2 or frame 3 in free variation, or frame 3 and frame 4 in positional variation.

In addition, two subtypes of individual nouns are distinguished on the basis of the differential way in which they exhibit contrasts between the three members of the category of nominal number (see discussion of patterns 3 and 4 in section 3.2.1.3.1.2. below).52

The four subclass membership statuses, one of which contains two subtypes, constitute the initial linguistic conditions of variation that affect the category of nominal number.53

In the revised version of the Case Study, the naming units of the pertinent data are the carriers of the non-extreme manifestations of the aspect of language under investigation, namely, the property of grammatical and lexical fusion. More specifically, they are multibase naming units with diversified grammatical and lexical internal structure (see section 3.1.2.1. above). The different modalities of internal structure exhibited by these naming units constitute the initial linguistic conditions of variation that affect the property of fusion. These are: in the grammatical dimension, compound status (see footnote 54) and multiword status; in the lexical dimension, single lexeme status and lexeme cluster status (see footnote 28).

3.2.1.1.2. Determining the pertinence of the initial linguistic conditions of variation

Not all the initial linguistic conditions of variation that affect a given linguistic aspect are necessarily pertinent to the cognitive study of that aspect.

The pertinence of these conditions is determined on the basis of their connection to the underlying concept: Only the initial conditions of variation that are pertinent to the underlying concept constitute the initial linguistic variables. Both in the Follow-up Study and in the revised version of the Case Study, all the initial linguistic conditions of variation are pertinent to the underlying concept. The subclass membership statuses are pertinent to the concept of multiplicity. The nonextreme fusional statuses are pertinent to the concept of individualness. The former and the latter constitute, therefore, the initial linguistic variables that affect the aspects of language under investigation in the two studies mentioned above (see Table II and Diagrams IV and V).

3.2.1.1.3. General characteristics of initial linguistic variables

The characteristics pertaining to the initial linguistic variables of both the Follow-up Study and the revised version of the Case Study can be generalized as follows:

(a) Initial linguistic variables may include features of both the grammatical and the lexical dimensions (as in the revised version of the Case Study).

(b) Initial linguistic variables pertain to varying depth levels of the analysis of the linguistic system. Consequently, at the outset of the investigation they may not be given by previous linguistic analysis but may have to be ascertained.

In the revised version of the Case Study, the initial linguistic variables are known at the outset. They are given by the grammatical and lexical analysis previously performed on the Papago linguistic system: definition of the word[54] and definition of the different orders of lexical units (see footnote 23).

In the Follow-up Study, on the other hand, the initial linguistic variables have to be ascertained. Their determination requires a grammatical analysis that goes beyond the definition of word classes. The resulting classes of naming units are, from a grammatical standpoint, noun subclasses. They are the subclass membership statuses listed in section 3.2.1.1.1. above, namely, mass status, aggregate status, individual status and mixed status.

(c) Initial linguistic variables may not be identical in all the stages of the investigation of a given problem. Thus, in the Follow-up Study the initial linguistic variables pertaining to a subsequent stage of the investigation of the core of the problem are those characterizing the naming units which are negatively relevant to the category of number (i.e., those which are not affected by this category). In the revised version of the Case Study, such variables are, in the grammatical dimension, those characterizing naming units which contain a single base each, and, in the lexical dimension, naming units which are lexeme conjuncts.

3.2.1.2. Identifying the initial cultural variables

In line with the definition of cultural variables given in section 2.1.2.1. above, the task of identifying the initial cultural variables is as follows: For each initial linguistic variable the question should be asked whether or not it is associated with one or several cultural variables. In both the Follow-up Study and the revised version of the Case Study, associated cultural variables suggested themselves. They are constituted by the variations due to either dialectal or other subgroup affiliation. Within the scope of the two studies mentioned above, however, none of the cultural variables that suggested themselves could be considered in the analysis.

3.2.1.3. Ascertaining the primary semantic distinctive features

In line with the definition of primary semantic distinctive features given in section 2.1.4.2. above, the goal of ascertaining these features requires that they be derived from the initial variables, either directly or through ancillary semantic distinctive features. The technique proposed for so doing is described in detail in sections 2.2.2. above.

Both in the Follow-up Study and in the revised version of the Case Study, the primary semantic distinctive features are ascertained without the help of ancillary semantic distinctive features.

In addition, since, as stated in section 3.2.1.2. above, no cultural variables are considered in either study, the primary semantic distinctive features are derived from the initial linguistic variables only.

In view of the above, the main task of ascertaining the primary semantic distinctive features of the aspects of language under investigation in the Follow-up Study and the revised version of the Case Study involves two specific tasks:

The first specific task consists in forming sets with the naming units of the pertinent data using the initial variables as a frame of reference.

The second specific task consists in inspecting the inventories of these sets in order to infer the characteristics of the aspect of language under investigation that are revealed by them.

The uncovering of the primary semantic distinctive features in the Follow-up Study and in the revised version of the Case Study will now be discussed in turn.

3.2.1.3.1. Ascertaining the primary semantic distinctive features of the category of nominal number in the Follow-up Study

The two specific tasks pertaining to this main task, namely, that of forming sets and that of inspecting their inventories, will now be discussed separately.

3.2.1.3.1.1. Forming Sets

In line with the instruction stated in section 3.2.1.3. above, this task consists in forming sets with the naming units of the pertinent data using the initial linguistic variables as a frame of reference.

As specified in sections 3.2.1.1. above, the initial linguistic variables pertaining to the category of nominal number are constituted by four noun subclass membership statuses. They are the following: mass status, aggregate status, individual status and mixed status. Two varieties of individual status are further distinguished and called individual type 1 status and individual type 2 status respectively.

These four variables, one of which contains two subtypes, provide the organizing principle for grouping the naming units of the pertinent data into five sets. These five sets include naming units with the following statuses: (1) mass status, (2) aggregate status, (3) individual type 1 status, (4) individual type 2 status and (5) mixed status.

3.2.1.3.1.2. Inspecting the inventories of the sets

In line with the instruction stated in section 3.2.1.3. above, this task consists in inspecting the inventories of the five sets formed with the initial linguistic variables in order to infer the characteristics of the category of nominal number that are revealed by them.

An inspection of the meaning variants of the naming units included in those five sets (a) reveals various contrastive patterns in which the three members of the category of nominal number participate and (b) suggests semantic distinctive features accounting for these patterns.

These two results will now be considered in turn.

Contrastive patterns in which the members of the category of nominal number participate

The meaning variants of the naming units included in the five sets formed by using the initial linguistic variables as a frame of reference enter into four contrastive patterns. These patterns display the covariance of different manifestations of the concept of multiplicity with the three members of the category of nominal number, namely, singular, plural, and distributive (see section 3.1.1.1 above). The four patterns are as follows:

Pattern 1 is that of singular versus nonsingular (i.e., the opposition of plural versus distributive is neutralized); it is symbolized as sg:$\overline{\text{sg}}$; it is displayed, on the one hand, by naming units with mass status, such as *xuudagĭ* "one body of water" versus xuxudagĭ "several bodies of water", on the other hand, by naming units with individual type 2 status, such as *ban* "one coyote" versus *baaban* "several coyotes".

Pattern 2 is that of nondistributive (i.e., the opposition of plural versus distributive is neutralized) versus distributive; it is symbolized as $\overline{\text{distr}}$:distr; it is displayed by naming units with aggregate status, such as *haivañ* "one cow, several cows from a single herd" versus *hahaivañ* "several cows from several herds (either one or several cows per herd)".

Pattern 3 is that of singular versus plural versus distributive; it is symbolized as sg:pl:distr; it is displayed by naming units with individual type 1 status, such as *daikuḑ* "one chair", *dadaikuḑ* "several chairs from a single household", *daddaikuḑ* "several chairs from several households (either one or several chairs per household)".

Pattern 4 is constituted by the manifestations of the category of number that are either in free variation or in positional variation with each other. The free variation is that of the pair singular versus nonsingular with the pair nondistributive versus distributive, symbolized as sg:$\overline{sg}$ in free variation with $\overline{distr}$:distr. The positional variation is that of the pair singular versus nonsingular, in the context no quantifier versus ha?i + noun "a few. . .", with the pair nondistributive versus distributive, in the context smu?ij + noun "there is a lot of . . . ". This positional variation is symbolized as sg:$\overline{sg}$ in positional variation with $\overline{distr}$:distr. Pattern 4 is displayed by naming units with mixed status, such as haaxañ "one saguaro cactus, several saguaro cacti (not in a cluster).[55] Note that pattern 4 is a combination of patterns 1 and 2, and that mixed status, therefore, can be regarded as an alternation between individual type 2 status and aggregate status.

In summary: The three members of the category of nominal number have been shown to enter into three basic contrastive patterns: (1) sg:$\overline{sg}$, (2) $\overline{distr}$:distr and (3) sg:pl:distr. They also enter into a combination of the two basic contrastive patterns (1) and (2), in which sg:$\overline{\text{sg}}$ is either in free variation, or in positional variation; with $\overline{\text{distr}}$:distr.

Semantic distinctive features

It is proposed that the three basic contrastive patterns displayed by the members of the category of nominal number can be accounted for by two related semantic oppositions. The first opposition is one of single locus versus several loci, where by locus is meant the culturally determined whereabouts of a concrete entity.[56] The second opposition is one of single entity versus several entities.

In the three basic contrastive patterns displayed by the members of the category of nominal number, the opposition of single entity versus several entities may be present either alone — as in the case with sg:$\overline{\text{sg}}$ (see discussion of pattern 1 above) — or together with the opposition of single locus versus several loci — as in the case with $\overline{\text{distr}}$:distr and sg:pl:distr (see discussion of patterns 2 and 3 above). When both oppositions are present, they are related to each other as follows: A given locus may be occupied by a single entity or by several entities. In the case of a single locus, occupation of the locus by a single entity is either differentiated from occupation of the locus by several entities — as in the case with pattern 3 in which singular is distinct from plural — or not differentiated from occupation of that locus by several entities — as in the case with pattern 2 in which singular and plural are not distinct. The latter case is interpreted, therefore, as a neutralization of the opposition of single entity versus several entities.

In the case of several loci, occupation by a single entity in each locus is never differentiated from occupation by several entities in each locus. In either case the manifestations of the category of nominal number is the distributive. In the distributive, therefore, the opposition of single entity versus several entities is interpreted as being neutralized.

In line with the above, the relation of the two oppositions of single locus versus several loci and single entity versus several entities can be specified as follows: When both oppositions are present, the opposition in terms of number of loci is dominant, the opposition in terms of number of entities is subordinate.

In summary: The opposition of single locus versus several loci is either present or absent but never neutralized. Since each term appears to be equally marked, it is assumed to be an equipollent opposition (see section 2.2.2.2. above). Each term, therefore, constitutes a separate semantic feature, namely, singleness of locus and multiplicity of loci. ← The opposition of single entity versus several entities, on the other hand, is never absent but it can be neutralized. The cases in which the opposition of single entity versus several entities is neutralized show that the marked term is single entity and the unmarked term is several entities. The opposition, therefore, is interpreted as a privative one (see section 2.2.2.2. above). Only one feature is assigned to it, namely, singleness of entity. Since at this stage of the analysis, neither term of the privative opposition appears to be qualified, the feature of singleness of entity is either present or absent. The three features of singleness of locus, multiplicity of loci and singleness of entity pertain to the category under investigation and are derived from the initial variables. They constitute, therefore, the primary semantic distinctive features of the category of nominal number.

3.2.1.3.2. Ascertaining the primary semantic distinctive features of the nonextreme manifestations of the property of fusion in the revised version of the Case Study

The two specific tasks pertaining to this main task, namely, that of forming sets and that of inspecting their inventories will now be discussed separately.

3.2.1.3.2.1. Forming sets

In line with the instruction stated in section 3.2.1.3. above, this task consists in forming sets with the naming units of the pertinent data, i.e., multibase naming units, using the initial [illegible]istic variables as a frame of reference.

As specified in sections 3.2.1.1. above, the initial linguistic variables pertaining to the property of fusion are constituted by two pairs of variables that correspond to the two dimensions of language. The pair that corresponds to the grammatical dimension includes compound status and multiword status. The pair that corresponds to the lexical dimension includes single lexeme status and lexeme cluster status (see fn 23).

Either of these two pairs of variables provides the organizing principle for grouping multibase naming units into sets. Each principle of grouping yields the same four sets. These four sets are as follows:

Set 1 includes compounds which are single lexemes, as with cukuḍ—xoxa "date palm tree(s), date(s) (lit.: owl's--nose-phlegm)".

Set 2 includes compounds which are lexeme clusters, as with haivañ-neeñ "beef tongue (lit.: cattle --tongue)" and Kaavul-neeñ "sheep tongue" or with haivañ-hihi "tripes (lit.:cattle--intestines)" and Kaavul-hihi "tripes (lit.: sheep--intestines)".

Set 3 includes multiword units which are single lexemes, as with CuKuḍ KuuK, name of a village, (lit.: owl has-hooted-there), or with cev KusvoKam "giraffe" (lit.: long necked-one).

Set 4 includes multiword units which are lexeme clusters, as with Kaak Keli "father's mother's older brother (lit.: father's-mother old-man)" and huʔul Keli "mother's mother's older brother (lit.: mother's-mother old-man)", or with KaaK ʔɔKs "father's mother's older sister (lit.: father's-mother old-woman)" and huʔul ʔoks "mother's mother's older sister (lit.: mother's-mother's old-woman)".

3.2.1.3.2.2. Inspecting the inventories of the sets

In line with the instruction stated in section 3.2.1.3. above, this task consists in inspecting the inventories of the 4 sets formed with the initial linguistic variables, in order to infer the characteristics of the property of fusion that are revealed by them.

An inspection of the meaning variants of the multibase naming units included in those four sets (a) reveals the contrastive patterns in which the nonextreme manifestations of the property of fusion participate and (b) suggests semantic distinctive features accounting for these patterns.

These two results will now be considered in turn.

Contrastive patterns in which the nonextreme manifestations of the property of fusion participate

The meaning variants of the multibase naming units included in the four sets formed by using the initial linguistic variables as a frame of reference enter into three contrastive patters. These patterns are as follows: Pattern 1 applies to multibase naming units referring to entities which native speakers group into classes without hesitation (see fn 62 below). This is interpreted to signify that these multibase naming units manifest a definite amount of individualness, namely, a small amount of individualness. Pattern 2 applies to multibase naming units which native speakers isolate without hesitation. This is interpreted to signify that these multibase naming units manifest a definite amount of individualness, namely, a great amount of individualness. Pattern 3 applies to multibase naming units which native speakers hesitate either to group into classes or to isolate. This is interpreted to signify that these naming units manifest a potential amount of individualness, namely, either a small amount or a great amount.[57]

It is proposed that these three patterns correspond to three different manifestations of the concept of individualness, two definite ones and a potential one.

The covariance of these three manifestations of the concept of individualness with the various non-extreme manifestations of the property of fusion, i.e., the various fusional statuses of multibase naming units, can be ascertained at this stage only in the case of patterns 1 and 2. Not enough data are, as yet, available in order to ascertain it in the case of pattern 3 (see fn 57).

The covariance of small amount and great amount of individualness with the fusional statuses of multibase naming units is as follows: Multibase naming units that manifest either a small amount or a great amount of individualness have no option as to lexical status but have an option as to grammatical status.

Thus, multibase naming units that manifest a small amount of individualness must have lexeme cluster status,[58] but may have either compound status or multiword status. This covariance is the one displayed in pattern 1. Instances of multibase naming units with lexeme cluster status and compound status are: haivañ — ñeeñ "beef tongue" and Kaavul — ñeeñ "sheep tongue". Instances of naming units with lexeme cluster status and multiword status are: Kaak Keli "father's mother's older brother" and huʔul Keli "mother's mother's older brother". Multibase naming units that manifest a great amount of individualness must have single lexeme status (see fn 58) but may have either compound status or multiword status. This covariance is the one displayed in pattern 2. An instance of a naming unit with single lexeme status and compound status is cuKuḍ—xoxa "date palm tree(s), date(s)". An instance of a naming unit with single lexeme status and multiword status is cev kusvokam "giraffe". In the case of pattern 3, the covariance of the fusional statuses — grammatical and lexical — of multibase naming units with a potential amount of individualness remains to be ascertained (see fn 57).

In summary: The fusional statuses of multibase naming units have been shown to enter into three contrastive patterns. Two of these patterns correspond to a definite amount of individualness, namely, small amount and great amount. The third pattern corresponds to a potential amount of individualness, namely, either a potentially small amount or a potentially great amount.

Patterns 1 and 2 suggest that there is a correlation between definite amounts of individualness and the fusional statuses of multibase naming units. More specifically, the correlation appears to be between a definite amount of individualness and the lexical fusional statuses of multibase naming units. The grammatical fusional status of these units seems to be irrelevant.[59] Thus, multibase naming units that have lexeme cluster status manifest a small amount of individualness, irrespective of their grammatical fusional status. Multibase naming units that have single lexeme status manifest a great amount of individualness, irrespective of their grammatical fusional status.

Pattern 3 displays the relation of a potential amount of individualness to the fusional statuses of multibase naming units. This pattern being as yet undetermined will not be included in the following discussion.

Semantic distinctive features

It is proposed that patterns 1 and 2 can be accounted for by one semantic opposition. This is capacity for lexical analogy.

Multibase naming units to which pattern 1 applies have a small amount of individualness which has been shown to correspond to lexeme cluster status. By definition, therefore, these naming units are in some way lexically analogous to the naming units with which they are grouped by native speakers (see fn 23). They are said, therefore, to have a capacity for lexical analogy.

Multibase naming units to which pattern 2 applies have a great amount of individualness which has been shown to correspond to single lexeme status. By definition, therefore, these naming units are not lexically analogous to any other naming units (see fn 23). They are said, therefore, to have no capacity for lexical analogy.

Although no clear-cut case of neutralization of the opposition of capacity for lexical analogy was observed, it is impressionistically interpreted as a privative opposition (see section 2.2.2.2. above). Consequently, a single semantic distinctive feature is assigned to it. This is lexical analogy potential. ← Since, at this stage of the analysis, neither term of the opposition of capacity for lexical analogy appears to be qualified, the feature of lexical analogy potential is said to be either present or absent. It is present whenever a multibase naming unit has lexeme cluster status. It is absent whenever a multibase naming unit has single lexeme status.

The feature of lexical analogy potential pertains to the property under investigation and is derived from the initial variables. It constitutes, therefore, a primary semantic distinctive feature of the nonextreme manifestations of the property of fusion (see Diagram V).

3.2.1.4. Ascertaining the basic cognitive content

In line with the definition of the basic cognitive content of a given aspect of language given in section 2.1.5. above, this task consists in ascertaining the relation of the primary semantic distinctive features to the underlying concept. The procedure for so doing is described in detail in sections 2.2.2. above.

The uncovering of the basic cognitive content of the aspects of language under investigation in the Follow-Up Study and in the revised version of the Case Study will now be described in turn.

3.2.1.4.1. Ascertaining the basic cognitive content of the category of nominal number in the Follow-Up Study

The task consists in ascertaining the relation of singleness of locus, multiplicity of loci and singleness of entity to the concept of multiplicity (see Diagram IV). This relation was described as follows in the Pilot Study: The category of nominal number "involves degrees of multiplicity, viewed, however, not from a numerical standpoint (as in the case of the well-known distinction between dual and plural), but from the standpoint of dispersion:

several entities in the same location . . . are less dispersed than several entities in different locations . . . . Thus the plural can be regarded as an intermediate step between complete collocation (the singular) and complete dispersion (the distributive)".[60]

The terms collocation and dispersion reflect not only the amalgamation of the three semantic distinctive features, but also the dominance of the features of singleness of locus and multiplicity of loci over the feature of singleness of entity.

In line with the above, these three features are assumed to constitute a gradual opposition, namely, that of collocation versus dispersion. The bearing of this opposition on the concept of multiplicity is interpreted as follows: The expression of the concept of multiplicity through the category of nominal number requires a choice between the three members of the category (singular, plural and distributive) on the basis of the gradual opposition of collocation versus dispersion.

Since this opposition is directly relevant to the concept of multiplicity, it can be said to pertain to the basic cognitive content of the category of nominal number.

Since, furthermore, the opposition is assumed to be a gradual one, each term constitutes a separate cognitive distinctive feature (see section 2.2.2.2. above).

The basic cognitive content of the category of nominal number, therefore, is constituted by the pair of cognitive distinctive features: collocation and dispersion.

3.2.1.4.2. Ascertaining the basic cognitive content of the nonextreme manifestation of the property of fusion in the revised version of the Case Study

The task consists in ascertaining the relation of lexical analogy potential to the concept of individualness (see Diagram V).

It is porposed that this relation is mediated through a cognitive process assumed to be universal and called lexical gestalt formation. This process consists in promoting the perception of multibase naming units as wholes while the perception of their constituent parts remains latent.

It seems that the latency of the perception of their constituent parts is not the same for all naming units but that it varies in strength from one naming unit to another. It is suggested that to this variation there corresponds, on the one hand, the presence or the absence of the feature of lexical analogy potential in given naming units, on the other hand, a low amount or a high amount of individualness on the part of these naming units.

Thus, if the perception of the constituent parts of a multibase naming unit "does not feel natural"[61] to the native speaker, this is interpreted to signify that the latency of this type of perception is weak. This seems to be the case with all multibase naming units with single lexeme status irrespective of their grammatical fusional status. It is suggested, therefore, that to a weak latency in the perception of the constituent parts of multibase naming units there corresponds, on the one hand, the absence of the feature of lexical analogy potential, on the other hand, a great amount of individualness.

If, on the other hand, the perception of the constituent parts of a multibase naming unit "feels natural"[62] to the native speaker, this is interpreted to signify that the latency of this type of perception is strong. This seems to be the case with all multibase naming units with lexeme cluster status, irrespective of their grammatical fusional status. It is suggested, therefore, that to a strong latency in the perception of the constituent parts of multibase naming units there corresponds, on the one hand, the presence of the feature of lexical analogy potential, on the other hand, a small amount of individualness.

The relation of lexical analogy potential to the concept of individualness as specified above is interpreted as constituting an opposition of capacity for lexical gestalt. This opposition applies to multibase naming units as follows:

Multibase naming units which have single lexeme status are said to exhibit a high capacity for lexical gestalt. Multibase naming units which have lexeme cluster status are said to exhibit a low capacity for lexical gestalt.

In line with the above, the opposition of capacity for lexical gestalt is interpreted as constituting a gradual opposition. The bearing of this opposition on the concept of individualness is interpreted as follows:

The expression of the concept of individualness through the nonextreme manifestations of the property of fusion requires a choice between two lexical fusional statuses (single lexeme status and lexeme cluster status) on the basis of the gradual opposition of capacity for lexical gestalt. Since this opposition is directly relevant to the concept of individualness, it can be said to pertain to the basic cognitive content of the nonextreme manifestations of the property of fusion. Since, furthermore, the opposition is assumed to be a gradual one, each term constitutes a separate cognitive distinctive feature (see section 2.2.2.2. above).

The basic cognitive content of the nonextreme manifestations of the property of fusion, therefore, is constituted by the pair of cognitive distinctive features: high lexical gestalt and low lexical gestalt.

3.2.2. Step 4: Uncovering the ramifications of the cognitive content

In line with the definition of the ramifications of the cognitive content given in section 2.1.5. above, this step consists of two parts. The first part of step 4 aims at uncovering the grammatical ramification of the cognitive content of the aspect of language under investigation.. The second part of step 4 aims at uncovering the lexical ramifications of the cognitive content of that aspect.

Each part of step 4 involves three main tasks. The first task consists in identifying the additional variables, both linguistic and cultural. The second task consists in ascertaining the secondary semantic distinctive features of the aspect of language under investigation. The third, and last, task consists in ascertaining the ramifications of the cognitive content of that aspect.

In the first part of step 4, the three main tasks are as follows: The first task consists in identifying the additional grammatical variables together with their associated cultural variables. The second task consists in ascertaining the grammatically-derived secondary semantic distinctive features. The third, and last, task consists in ascertaining the grammatical ramifications of the cognitive content of the aspect of language under investigation.

In the second part of step 4, the three main tasks are as follows: The first task consists in identifying the additional lexical variables together with their associated cultural variables.

The second task consists in ascertaining the lexically-derived secondary semantic distinctive features.

The third, and last, task consists in ascertaining the lexical ramifications of the cognitive content of the aspect of language under investigation.

In both parts of step 4, the three main tasks are carried out separately and sequentially, as is the case with their counterparts in step 3. They constitute, therefore, the same iterative sequence of tasks (see section 2.3.3.2. above).

The only two specifications that suggest themselves have to do with the additional linguistic variables. The first specification deals with the criterion for determining the pertinence of the additional linguistic (grammatical and lexical) conditions of variation. The second specification deals with the general characteristics of additional lexical variables.

These specifications will be discussed first;

then, a detailed account of the application of step 4 both in the Follow-up Study and in the revised version of the Case Study will be presented in sections 3.2.3. and 3.2.4. respectively.

3.2.2.1. Determining the pertinence of the additional linguistic conditions of variation

In line with the definition of the additional linguistic (grammatical and lexical) variables given in section 2.1.2.2. above, the pertinence of the additional linguistic (grammatical and lexical) conditions of variation is determined on the basis of whether or not they allow to form, with the naming of the pertinent data, sets that display contrasts between the initial variables. Only the additional linguistic (grammatical and lexical) conditions of variation that allow to form such sets constitute the additional linguistic (grammatical or lexical) variables.

3.2.2.2. General characteristic of the additional lexical variables

As yet general characteristics have been observed only concerning the additional lexical variables, and not concerning the additional grammatical variables.

The additional lexical variables that have suggested themselves so far are folk-taxonomic classes[63] and subclasses. These constitute a system of classification of the lexicon directly derivable from the observation of informants' responses. Such a classification is therefore behavioral and not analytic (see section 2.1.1. above). In the absence of analytic knowledge of the lexical dimension, the folk-taxonomic classification constitutes the only source of information available.

Naming units designating folk-taxonomic classes are called folk-taxonomic labels. Such labels are utilized for the dual purpose of eliciting pertinent data from informants and of collecting such data from texts.[64]

The elicitation of data from informants is done with standardized questions called folk-taxonomic questions. In these questions, the most general folk-taxonomic labels available are chosen, in order to avoid the misunderstandings between investigator and informant that may result from the use of labels which are too specific. An example would be the label cehia which the investigator might interpret to mean "young woman", but which the informant will understand to mean "young girl around puberty".

In collecting data from texts, on the other hand, all the labels designating subclasses of the relevant folk-taxonomic classes are pertinent.

3.2.3. Application of step 4 in Follow-up Study

As stated in section 3.2.2. above step 4 includes two parts. These will now be considered in turn, as they apply to the category of nominal number in Papago.

3.2.3.1. First part of step 4

The tasks pertaining to the first part of step 4 include (1) identifying the additional grammatical variables as well as the associated cultural variables, (2) ascertaining the grammatically-derived, secondary semantic distinctive features, and (3) establishing the grammatical ramifications of the cognitive content (see section 3.2.2. above).

3.2.3.1.1. Additional grammatical variables and associated cultural variables of the category of nominal number

In the Follow-up Study, only relevant additional grammatical variables are considered. Associated cultural variables suggested themselves but were not included in the analysis (see section 3.2.1.2. above).

3.2.3.1.1.1. Additional grammatical conditions of variation

One additional grammatical condition of variation suggested itself. It is the cryptotype of animateness[65] with its two members animate status and inanimate status. The cryptotype of animateness in Papago is defined in terms of the co-occurrence pattern of naming units functioning as subjects with a set of predicates serving as diagnostic contexts, as follows: "to be standing" pl. subject — for naming units with animate status geegck; for naming units with inanimate status cuuc; "to be lying down" pl. subject — for naming units with animate status voopi; for naming units with inanimate status veec.

3.2.3.1.1.2. Pertinence of the cryptotype of animateness

In line with the criterion for pertinence stated in section 3.2.2.1. above, the pertinence of the cryptotype of animateness to the cognitive analysis of the category of nominal number depends on whether or not it can serve to form sets of naming units displaying a contrastive distribution of the initial variables, namely, the various subclass membership statuses.

Since this is answered in the affirmative (see section 3.2.3.1.2.1. below), the cryptotype of animateness is an additional grammatical variable of the category of nominal number.

3.2.3.1.2. Grammatically-derived secondary semantic distinctive features of the category of nominal number

In line with the definition of secondary semantic distinctive features given in section 2.1.4.2. above, the goal of ascertaining these features requires that they be derived from the additional grammatical variable, i.e., the cryptotype of animateness, either directly or through ancillary semantic distinctive features. The technique proposed for so doing is described in detail in section 2.2.2. above.

The two specific tasks pertaining to the main task of ascertaining the grammatically-derived semantic distinctive features of the category of nominal number are: (1) forming sets with the naming units of the pertinent data using the additional grammatical variable as a frame of reference; (2) inspecting the inventories of these sets in order to infer the characteristics of the aspect of language under investigation that are revealed by them. These two specific tasks will now be discussed in turn.

3.2.3.1.2.1. Forming sets

In using the cryptotype of animateness to form sets, it was noted that status as to animateness could not be established for all pertinent naming units. Some of these naming units do not cooccur with the predicates that are diagnostic for animateness (see section 3.2.3.1.1.1. above). Thus, water (xuudagi) is neither viewed as "standing" or even as "lying down". It is the container in which water is located, such as a pond, that is viewed as "lying down". This distinction is utilized as a criterion for a first differentiation of naming units into marked and unmarked as to animateness. Naming units marked as to animateness were further differentiated on the basis of the status (animate or inanimate) that could be established for them. These differentiations resulted in three sets of naming units: a set of naming units with animate status, called the set of animates; a set of naming units with inanimate status, called the set of inanimates; a set of naming units unmarked as to animateness, called the unmarked set.

3.2.3.1.2.2. Inspecting the inventories of the sets

An inspection of the inventories of the three sets formed by using the cryptotype of animateness as a frame of reference (a) reveals contrastive distributional patterns in which the noun subclass membership statuses participate, and (b) suggests semantic distinctive features accounting for these patterns. These two results will now be considered in turn.

Contrastive distributional patterns in which the noun subclass membership statuses participate

The distribution of the initial variables wihin the set of animates, the set of inanimate and the unmarked set reveals two patterns:

Pattern 1 is that constituted by naming units with mass status: they are found only in the unmarked set.

Pattern 2 is that constituted by naming units with aggregate, individual (type 1 and type 2) and mixed statuses: they are found both in the set of animates and in the set of inanimates.

← The relation of the cryptotype of animateness (i.e., the additional grammatical variable) to the subclass membership statuses (i.e., the initial variables) is diagrammed in figure 1.

← Examples of naming units with the subclass membership statuses corresponding to the initial variables in the two marked sets and in the unmarked set are shown in List (1).

The outstanding characteristic of the distribution of the initial variables within the three sets formed with the additional grammatical variable is that membership in the unmarked set appears to coincide with mass status. By virtue of this distributional characteristic, therefore, naming units with mass status are set off from all other naming units, i.e., from naming units with aggregate, individual and mixed statuses. This is interpreted to mean that the initial variables are not on a par with each other, but must be viewed in terms of two basic distinctions. These are: mass status on the one hand, aggregate versus individual type 1 versus indidividual type 2 versus mixed status on the other hand. The relation between the initial variables is diagrammed in figure 2.

The distribution of the initial variables within the three sets formed with the additional grammatical variable is further interpreted to mean that the cryptotype of animateness relates to subclass membership status as follows: (a) it has a diagnostic function in regard to the mass versus non-mass distinction by serving to set off mass status against the other statuses: (b) it has no diagnostic function in regard to the distinction, within non-mass status, of aggregate versus individual type 1 versus individual type 2 versus mixed; (c) it has a qualifying function in regard to the subclass membership statuses to which it applies: it serves to qualify each of them by adding an animateness status to a given subclass membership status. Thus, aggregate can be qualified as animate aggregate versus inanimate aggregate, and so on.

Semantic distinctive features

It is proposed that the two distributional patterns displayed by the noun subclass membership statuses can be accounted for by two semantic oppositions.

The first semantic opposition accounts for pattern 1: It emerges from a comparison of naming units with mass status and naming units with nonmass status. Entities referred to by these two types of naming units are differentiated in terms of an opposition of *inherent boundedness*. Thus, naming units with mass status refer to entities that have no boundaries of their own; these entities are *inherently unbounded*. The entities referred to by naming units with non-mass status, on the other hand, all have boundaries of their own; the boundaries are either complete, as is the case with most concrete entities, or partial, as is the case with body parts and terrain features (e.g. nose or mountain); these entities are *inherently* bounded.

Although no clearcut case of neutralization of the opposition of inherent boundedness was observed, it is impressionistically interpreted as a privative opposition (see section 2.2.2.2. above). Consequently, a single semantic distinctive feature is assigned to it, namely, inherent boundedness. Since at this stage of the analysis neither term of the opposition of inherent boundedness appears to be qualified, the feature of inherent boundedness is said to be either present or absent.

The feature of inherent boundedness pertains to the category under investigation and is derived from an additional variable. It constitutes, therefore, a secondary semantic distinctive feature of the category of nominal number (see Diagram IV and Table II).

The second semantic opposition accounts for pattern 2. It emerges from a comparison of naming units with animate status and naming units with inanimate status. Entities referred to by these two types of naming units are differentiated in terms of an opposition of capacity for volition. Thus, naming units with animate status refer to entities that are capable of volition. Naming units with inanimate status refer to entities that are incapable of volition. This opposition applies only to the nonmass statuses but is independent of the distinctions between them, i.e., those of aggregate status versus individual statuses versus mixed status. Naming units with both animate and inanimate status may have either aggregate or individual 1 or individual 2 or mixed statuses. Altough no clearcut case of neutralization of the opposition of capacity for volition was observed, it too is impressionistically interpreted as a privative opposition (see section 2.2.2.2. above). Consequently, a single semantic distinctive feature is assigned to it, namely, capacity for volition. Since at this stage of the analysis neither term of the opposition of capacity for volition appears to be qualified, the feature of capacity for volition is said to be either present or absent.

The feature of capacity for volition is derived from the cryptotype of animateness, an additional variable, and is proper to that variable. It constitutes, therefore, an ancillary semantic distinctive feature with respect to the category of nominal number (see section 2.1.4.1. above). Since the relation between the feature of capacity for volition and the category of nominal number could not be established at this point, it is concluded that the category is not manifested grammatically. It remains to be ascertained whether or not it is manifested lexically (see section 3.2.3.2.2 below).

In summary, then, the category of nominal number has only one grammatically-derived secondary semantic distinctive feature, that of inherent boundedness.

3.2.3.1.3 Grammatical ramifications of the cognitive content of category of nominal number

These are constituted by the relation of the grammatically-derived secondary semantic distinctive features to the primary semantic distinctive features and to the underlying concept (see Diagram I~~II~~ 9). More specifically, they are constituted by the relation of inherent boundedness ——————→ to singleness of locus, multiplicity of loci and singleness of entity, on the one hand, and to the concept of multiplicity, on the other hand (see Diagram IV). The relation between the two types of semantic distinctive features specified above can be said to have the following manifestation: Concrete entities that differ in terms of inherent boundedness also differ in terms of their relation to their respective loci. This manifestation concerns both inherently unbounded entities (which consist of the entities referred to by naming units with mass status) and inherently bounded entities (which consist of the entities referred to by naming units with nonmass statuses). The feature of inherent boundedness allows to distinguish two types of relation between concrete entities and their respective loci: that characteristic of inherently unbounded entities and that characteristic of inherently bounded entities.

The relation of inherently unbounded entities to their respective loci is as follows: It is proposed that an inherently unbounded entity is viewed as coextensive with its locus in the sense of occupying the locus in its entirety, i.e., with no unoccupied spots in between. It is this coextension that gives the entity its shape.[67] Examples are: water spilled on nonporous ground, or a cloud in the sky.[68]

The relation of bounded entities to their respective loci in terms of coextension cannot yet be specified at this stage of the analysis. It will emerge later (see section 3.2.3.2.3 below).

In short, ←the relation of the inherent boundedness of concrete entities to their respective loci has resulted in the specification of the relation of inherently unbounded entities to their respective loci as one entailing coextension between a given entity and its locus. The bearing of this specification on singleness of locus, multiplicity of loci and singleness of entity is shown in the potentiality for grouping in a single locus exhibited by the pertinent entities.

The bearing of the coextension of a given entity with its locus on singleness of locus, multiplicity of loci and singleness of entity is investigated by taking into account the different manifestations of the category of nominal number in terms of the different subclass membership statuses. With inherently unbounded entities, the following characteristics are relevant to their grouping in a single locus: As will be remembered, (1) they have mass status; (2) the latter status corresponds to an opposition between singular versus nonsingular, symbolized as $\mathrm{sg}:\overline{\mathrm{sg}}$ (see discussion of pattern 1 in section 3.2.1.3.1.2 above); singular implies a single entity in a single locus whereas nonsingular — in view of the coextension of entities having mass status with their respective loci — implies several entities in several loci, with a single entity per locus (see discussion of inherently unbounded entities further above in this section).

Since with mass status as a result of the neutralization of plural and distributive there is no plural and since the plural indicates that several entities are viewed as being located in a single locus, the set of possibilities applying to the entities referred to by naming units with mass status is as follows: Whenever reference is made to a single entity, it is viewed as being located in a single locus; whenever reference is made to several entities they are viewed as being located in several loci, with a single entity per locus. Therefore, with inherently unbounded entities there is no potentiality for grouping in a single locus. The possibility of several such entities occupying the same locus side by side does not exist. Several unbounded entities must occupy several loci, (although they may have the same circumstantial whereabouts, as water and wine in a single glass or coffee and cream in a single cup, see fn.56).[69]

Thus, with inherently unbounded entities, the absence of inherent boundedness entails absence of potentiality for grouping in a single locus. With inherently bounded entities, on the other hand, the presence of inherent boundedness does not necessarily entail the presence of potentiality for grouping in a single locus. The conditions pertaining to the relation between presence of inherent boundedness and potentiality for grouping in a single locus are not found among the grammatical factors that have been considered so far. This relation, therefore, will be reexamined when lexical factors are considered in connection with the investigation of the lexical ramifications of the cognitive content.

In the above, the relation of the inherent boundedness of concrete entities to singleness of locus, multiplicity of loci and singleness of entity has been shown to be manifested by one opposition set off by the Papago culture, namely that of potentiality for grouping in a single locus. The bearing of this opposition on the concept of multiplicity is as follows: The expression of the concept of multiplicity through the category of nominal number has to take into account the potentiality for grouping in a single locus exhibited by inherently unbounded entities. The opposition of potentiality for grouping in a single locus, therefore, pertains to the grammatical ramifications of the cognitive content of the category of nominal number. Although no clearcut case of neutralization of the opposition of potentiality for grouping in a single locus was observed, it is impressionistically interpreted as a privative opposition (see section 2.2.2.2. above). Consequently, a single cognitive distinctive feature is assigned to it, namely, that of _potentiality for grouping in a single locus_. Since at this stage of the analysis neither term of the opposition appears to be qualified, the feature of potentiality for grouping in a single locus is said to be either present or absent.

In summary, the grammatical ramifications of the cognitive content of the category of nominal number (a) consist of the cognitive distinctive feature of potentiality for grouping in a single locus, and (b) show that this cognitive feature is absent in inherently unbounded entities, i.e., entities referred to by naming units with mass status.

3.2.3.2. Second part of step 4

The tasks pertaining to the second part of step 4 include (1) identifying the additional lexical variables as well as the associated cultural variables, (2) ascertaining the lexically-derived as well as culturally-derived secondary semantic distinctive features and (3) establishing the grammatical ramifications of the cognitive content (see section 3.2.2. above).

3.2.3.2.1. Additional lexical variables and associated cultural variables

In the Follow-up Study, only additional lexical variables are considered. Associated cultural variables suggested themselves but were not considered in the analysis (see section 3.2.1.2 above).

3.2.3.2.1.1. Additional lexical conditions of variation

The additional lexical conditions of variation that suggested themselves are the various folk-taxonomic classes represented in the pertinent data. Two broad folk-taxonomic classes were chosen for the purpose of the present study: animals (haʔicu doakam) and things (haʔicu).[70] To each of these two folk-taxonomic classes corresponds a set of naming units, called the set of animals and the set of things respectively.

3.2.3.2.1.2. Pertinence of folk taxonomic classes

In line with the criterion for pertinence stated in section 3.2.2.1. above, the pertinence of the folk taxonomic classes mentioned above to the cognitive analysis of the category of nominal number depends on whether or not they can serve to form sets of naming units displaying a contrastive distribution of the initial variables, namely, the various sub-class membership statuses. Since the answer is affirmative the two broad folk taxonomic classes mentioned above constitute additional lexical variables of the category of nominal number in Papago. The sets formed with these variables constitute therefore the lexical frame of reference within which the distribution of the initial variables can be observed.

The distribution of the initial variables in these two sets is as follows: naming units with aggregate as well as with individual type 1 and type 2 statuses are found in both sets; naming units with mixed status are found only in the set of animals;[71] naming units with mass status are found only in the set of things. Examples of naming units with the subclass membership statuses corresponding to the initial variables in the two folk taxonomic sets are shown in List (2).

3.2.3.2.2. Lexically-derived secondary semantic distinctive features of the category of nominal number

From both of the sets formed with members of the two broad folk taxonomic classes specified in section 3.2.3.2.1. above, naming units that contrast in terms of the initial variables were sampled and compared. An inspection of their meaning variants reveals two major patterns.

The first major pattern confirms the distinction between concrete entities in terms of the feature of inherent boundedness which was previously observed to constitute the grammatically-derived secondary semantic distinctive feature of the category of nominal number (see section 323.12 above): things referred to by naming units with mass status are inherently unbounded entities; things referred to by naming units with non-mass status are inherently bounded entities.

The second major pattern reveals (a) a distinction between the non-mass subclass membership statuses (i.e., aggregate, individual and mixed) and (b) a qualification of the characteristic(s) of each non-mass subclass membership status in terms of the cryptotype of animateness. The distinction and the qualification of the non-mass subclass membership statuses revealed by the second major pattern will now be discussed.

The distinction concerns the various possibilities of association between inherently bounded entities as viewed by the Papago culture. It involves two oppositions: associatedness, and modes of association between entities. The first opposition differentiates between inherently bounded entities that are associated with other entities and inherently bouhded entities that are not associated with other entities. They are called *associated entities* and *non-associated entities* respectively. The second opposition differentiates between associated entities on the basis of the nature of the entities with which they are associated. It is proposed that in the Papago culture, entities are viewed as entering into either one or two types of association with other entities: association with entities of the same kind, association with entities of a different kind. Entities that enter into the first type of association are called *mutually associated*. Entities that enter into the second type of association are called *externally associated*. It is proposed that these two modes of association are viewed by the Papago culture as mutually exclusive. When both are conceivable, only one is admitted. Thus, chickens or cows being viewed as mutually associated, their external association with their owner is not taken into account by the culture.

The two oppositions of associatedness and modes of association are manifested as follows: Naming units with aggregate status refer to animals and things that are viewed as coming in groups and as being associated with each other. They can be said to be mutually associated. Naming units with individual type 1 status refer to animals and things that are viewed as being associated with the people who are their owners or makers. They can be said to be externally associated.[72] Naming units with individual type 2 status refer to animals and things that are neither viewed as being associated with each other nor as being associated with people. They can be said to be non-associated.[73] Naming units with mixed status (see discussion of pattern 4 in section 3.2.1.3.1.2 above) refer to animals which are viewed as not being associated with people. They are viewed as being able to alternate between living in groups or not living in groups. They can be said to alternate between mutually associated and non-associated.[74] The two oppositions involved in the distinction between the nonmass subclass membership statuses manifested in the set of animals and the set of things are diagrammed in figure 3 (with a broken arrow indicating the permitted alternation).

The qualification of the non-mass subclass membership statuses by the cryptotype of animateness involves the superimposition of the semantic distinctive feature of the cryptotype (capacity for volition) on the manifestations of the two pertinent oppositions just discussed (associatedness and modes of association). Since the two members of the cryptotype (animate, inanimate) are coextensive with the set of animals and that portion of the set of things affected by the oppositions of associatedness and modes of association, the semantic distinctive feature of the cryptotype (capacity for volition) also applies to the difference between animals and things. Thus, animals are capable of volition by virtue of being animate; things are incapable of volition by virtue of being inanimate. The superimposition of the feature of capacity for volition on the manifestations of the oppositions of associatedness and modes of association results in a qualification of the nature of the association or lack of association. Thus, if the entity that is viewed as entering—or not entering—into an association is an animal, the association—or lack of association—involves the will. If the entity that is viewed as entering-or not entering-into an association is a thing, the association does not involve the will. In the first case the association or non-association, is said to be a *volitional association* or *volitional non-association*. In the second case, the association, or non-association, is said to be a *non-volitional association* or *non-volitional non-association*. The qualification of the two pertinent oppositions in the case in which the association or non-association involves the will is manifested as follows: The will of animals that are mutually associated is viewed as being influenced by that of every other animal with which they are so associated. The will of animals that are externally associated is viewed as being influenced by that of the oeople with whom they are so associated. The will of animals that are non-associated is viewed as being uninfluenced. The will of animals that can alternate between mutually associated and non-associated is viewed as being influenced by that of every other animal with which they are so associated or else as uninfluenced. The qualification of the oppositions of associatedness and modes of association by the cryptotype of animateness, as manifested in the set of animals and the set of things, is diagrammed in *figure 4* (with a broken arrow indicating the permitted alternation).

From the discussion presented above the following conclusions can be drawn : (1) The opposition of inherent boundedness has been shown previously to constitute a grammatically-derived secondary semantic distinctive feature of the category of nominal number. Since, however, this feature is here also derived from the additional lexical variables, it constitutes a lexically-derived secondary semantic distinctive feature in addition to being a grammatically-derived one. Although no clearcut case of neutralization of the opposition of associatedness was observed it is interpreted as a privative opposition (see section 2.2.2.2. above). Consequently, a single semantic distinctive feature is assigned to it, namely, that of *associatedness*. Since at this stage of the analysis neither term of the opposition appears to be qualified, the feature of associatedness is said to be either present or absent.

(2) The opposition of modes of association, on the other hand, appears to be equipollent (see section 2.2.2.2. above) since each term is equally marked. Each term, therefore, constitutes a separate semantic feature, namely, those of mutual association and of external association. These three features pertain to the initial variables since they accompany differences in the subclass membership statuses that constitute these variables. Furthermore, the three features are derived from the additional lexical variables. Consequently they constitute lexically-derived secondary semantic distinctive features of the category of nominal number.

In summary, then, the category of nominal number has one lexically-derived secondary semantic distinctive feature which is also grammatically-derived, inherent boundedness, and three secondary semantic distinctive that are only lexically-derived: associatedness, mutual association and external association. The three lexically-derived semantic distinctive features are qualified by the semantic distinctive features of the cryptotype of animateness, namely capacity for volition.

3.2.3.2.3. Lexical ramifications of the cognitive content of the category of nominal number

These are constituted by the relation of the lexically-derived secondary semantic distinctive features to the primary semantic distinctive features and to the underlying concept (see Diagram IX). More specifically, they are constituted by the relation of the features of inherent boundedness, associatedness, mutual association, external association and the qualification of capacity for volition, to the features of singleness of locus, multiplicity of loci and singleness of entity, on the one hand, and to the concept of multiplicity, on the other hand (see Diagram IV).

The relation of the lexically-derived secondary to the primary semantic distinctive features can be said to have two manifestations. The first manifestation is as follows: Concrete entities that differ in terms of inherent boundedness also differ in terms of their relation to their respective loci. The second manifestation is as follows: Concrete entities that differ in terms of associatedness, mutual association and external association as well as the qualification of capacity for volition, also differ in terms of their relation to their respective loci. These two manifestations will be investigated in turn.

The first manifestation of the relation of the lexically-derived secondary semantic distinctive features to the primary semantic distinctive features concerns only the inherently unbounded entities (which consist of entities referred to by naming units with mass status). The relation of inherently unbounded entities to their respective loci that emerges from a consideration of lexical factors is the same as that which has already emerged from a consideration of grammatical factors: inherently unbounded entities are viewed by the Papago culture as entering into a coextensive relation with their respective loci (see section 3.2.3.1.3. above).

The second manifestation of the relation of the lexically-derived secondary semantic distinctive features and of their qualification to the primary semantic distinctive features concerns only inherently bounded entities. It is proposed that the features of associatedness, mutual association and external association serve to distinguish two modes of relation between inherently bounded entities and their respective loci: *coextension* and *non-coextension* with the locus. Coextension is exhibited by non-associated entities (which consist of entities referred to by naming units with individual type 2 status). The locus of a non-associated entity is coextensive with the boundaries of that entity. Non-coextension is exhibited by both mutually associated entities (which consist of entities referred to by naming units with aggregate status) and externally associated entities (which consist of entities referred to by naming units with individual type 1 status): The locus of a mutually associated entity is that which it occupies together with the group to which it belongs; the locus of an externally associated entity is that which it occupies together with its maker or user. In neither case is the locus coextensive with the boundaries of the entity.

In addition, the two modes of relation between inherently bounded entities and their respective loci can be qualified by the feature of capacity for volition as follows: Coextension can be exhibited by entities that are either capable of volition (such as a "coyote") or incapable of volition (such as a "mountain"). Non-coextension can be exhibited by mutually associated entities that are either capable of volition (such as "cows") or incapable of volition (such as "beans"); it can be exhibited by externally associated entities that are either capable of volition (such as a "horse") or incapable of volition (such as a "shirt").

In the above, the relation of the inherent boundedness of concrete entities to their respective loci has resulted in the specification of the relation of inherently unbounded entities to their respective loci as one entailing the coextension of a given entity with its locus. It has also resulted in the specification of the relation of inherently bounded entities to their respective loci as one entailing (a) the coextension of a given entity with its locus if the entity is nonassociated and (b) the non-coextension of a given entity with its locus if the entity is either mutually associated or externally associated. In addition, the relation of inherently bounded entities to their respective loci was shown to be qualified in terms of the capacity for volition of the entities entering in the relation.

The bearing of these specifications on multiplicity of locus and multiplicity of entities is made apparent by an examination of the potentiality for grouping in a single locus exhibited by the pertinent entities. The bearing of the coextension of inherently unbounded entities with their respective loci on multiplicity of locus and multiplicity of entities was previously ascertained by taking into account the manifestations of the category of nominal number in terms of mass status. It was shown that with inherently unbounded entities there is no potentiality for grouping in a single locus (see section 3.2.3.1.3. above). The bearing of the coextension and the noncoextension of inherently bounded entities with their respective loci on multiplicity of locus and multiplicity of entities will now be investigated by taking into account the various manifestations of the category of nominal number in terms of non-mass statuses.

With inherently bounded entities in coextension with their respective loci, the following characteristics are relevant to the potentiality of their grouping in a single locus: (1) they have individual type 2 status; (2) the latter status corresponds to an opposition between singular versus nonsingular, symbolized as $\underline{sg:\overline{sg}}$ (see discussion of pattern 1 in section 3.2.1.3.1.2. above); (3) singular implies a single entity in a single locus whereas nonsingular — in view of the coextension of entities having individual type 2 status with their respective loci — implies several entities in several loci with a single entity per locus (see discussion of nonassociated entities further above in this section). Since with individual type 2 status (as a result of the neutralization of plural and distributive) there is no plural, and since only the plural indicates that several entities are viewed as being located in a single locus, the set of possibilities applying to entities referred to by naming units with individual type 2 status is as follows: whenever reference is made to a single entity, it is viewed as being located in a single locus; whenever reference is made to several entities, they are viewed as being located in several loci, with a single entity per locus. Therefore, with inherently bounded entities in coextension with their respective loci, just as with inherently unbounded entities, there is no potentiality for grouping in a single locus (although they may have the same circumstantial whereabouts, see fn.56).

As stated further above, two types of inherently bounded entities exhibit non-coextension with their respective loci: mutually associated entities and externally associated entities. With mutually associated entities, the following characteristics are relevant to the potentiality of their grouping in a single locus: (1) they have aggregate status; (2) the latter status corresponds to an opposition between nondistributive versus distributive symbolized as $\underline{\overline{\text{distr}}\text{:distr}}$ (see discussion of pattern 2 in section 3.2.1.3.1.2.above); (3) nondistributive implies either a single entity or several entities in a single locus whereas distributive implies several entities in several loci with either a single entity or several entity per locus (see discussion of primary semantic distinctive features in section 3.2.1.3.1.). Since with aggregate status, when dealing with entities belonging to a single group, there is a neutralization of singular versus plural, the set of possibilities applying to entities referred to by naming units with aggregate status is as follows: whenever reference is made to one or several entities belonging to a single group, that entity or those entities is/are viewed as being located in a single locus; whenever reference is made to several entities belonging to several groups, they are viewed as being located in several loci, with either a single entity or several entities per locus. With externally associated entities, the following characteristics are relevant to the potentiality of their grouping in a single locus: (1) they have individual type 1 status; (2) the latter status corresponds to an opposition between singular versus plural versus distributive, symbolized as sg:pl:distr (see discussion of pattern 3 in section 3.2.1.3.1.2.above); (3) both singular and plural imply single locus, whereas distributive implies several loci (see discussion of primary semantic distinctive features in section 3.2.1.3.1. above). Since with individual type 1 status the singular is distinct from the plural and the plural is distinct from the distributive, the set of possibilities applying to entities referred to by naming units with individual type 1 status is as follows: whenever reference is made to a single entity in conjunction with a single maker or user, it is viewed as being located in a single locus: whenever reference is made to several entities in conjunction with a single maker or user, they are viewed as being located in a single locus; whenever reference is made to several entities in conjunction with several makers or users, they are viewed as being located in several loci with either a single entity or several entities per locus. With the two types of inherently bounded entities exhibiting noncoextension with their respective loci, therefore, there is potentiality for grouping in a single locus. From the above it follows that the potentiality for grouping in a single locus exhibited by concrete entities depends on their coextension with their respective loci. With entities that are coextensive with their respective loci, there is no potentiality for grouping in a single locus. With entities that are noncoextensive with their respective loci, on the other hand, there is potentiality for grouping in a single locus.

A further manifestation of the category of nominal number determined by one subclass membership status, not covered in the above, is that of mixed status. To mixed status does not correspond an additional type of inherently bounded entities but an alternation between two types of entities: either nonassociated or mutually associated. The potentiality for grouping in a single locus exhibited by entities referred to by naming units with mixed status, therefore, is either the same as that of nonassociated entities, or the same as that of mutually associated entities. Thus, with entities referred to by naming units with mixed status, there is an alternation between no potentiality for grouping in a single locus and potentiality for grouping in a single locus.

In addition, the bearing of capacity for volition on singleness of locus, multiplicity of loci, and singleness of entity consists in the further qualification of potentiality for grouping in a single locus exhibited by concrete entities, as follows: entities with which the potentiality for grouping in a single locus is present are either capable of volition or incapable of volition, entities with which the potentiality for grouping in a single locus is absent are either capable of volition or incapable of volition.

In the above, the relation of the features of inherent boundedness, associatedness, mutual association, external association, and of the qualification of capacity for volition exhibited by concrete entities to the features of singleness of locus, multiplicity of loci and singleness of entity has been shown to be manifested in one opposition set off by the Papago culture: potentiality for grouping in a single locus. This opposition has been shown to be qualified in some cases by the capacity for volition of the pertinent entities. The bearing of this opposition and its qualification on the concept of multiplicity is as follows: The expression of the concept of multiplicity through the category of nominal number has to take into account the potentiality for grouping in a single locus exhibited by both inherently unbounded and inherently bounded entities. The capacity for volition of inherently bounded entities, on the other hand, does not affect the manifestations of the category of nominal number. Consequently, only potentiality for grouping in a single locus pertains to the lexical ramifications of the cognitive content of the category of nominal number. Capacity for volition pertains only to the cognitive content of the cryptotype of animateness. As previously stated (see section 3.2.3.1.3. above), potentiality for grouping in a single locus is interpreted as a privative opposition and hence a single cognitive distinctive feature is assigned to it, namely, that of *potentiality for grouping in a single locus*.

In summary, the lexical ramifications of the cognitive content of the category of nominal number (a) consist of the cognitive distinctive feature of potentiality for grouping in a single locus and (b) show that this feature is absent in the case of entities that are coextensive with their respective loci (this includes entities referred to by naming units with mass status and individual type 2 status) while it is present in the case of entities that are non-coextensive with their respective loci (this includes entities referred to by naming units with aggregate status and individual type 1 status).

3.2.3.3. Summary of the cognitive analysis of category of nominal number

The cognitive analysis of the category of nominal number presented above has resulted in a specification of the cognitive significance of the category itself and of the conditions affecting its manifestations, as well as of the part played in its manifestations by a related category, the cryptotype of animateness.

3.2.3.3.1. Cognitive significance of the category of nominal number and of the conditions affecting its manifestations.

The basic cognitive content has shown that the three members of the category of nominal number reflect two cognitive distinctive features, collocation and dispersion. The ramifications of the cognitive content have shown that the subclass membership statuses which determine the various manifestations of the category of nominal number reflect one cognitive distinctive feature, potentiality for grouping in a single locus. The latter applies to the subclass membership statuses as follows: it is present in aggregate and individual type 1 statuses; it is absent in mass and individual type 2 statuses; it is alternatively present and absent in mixed status. The cognitive features pertaining to the basic cognitive content of the category of nominal number allow one to place its members (i.e. singular, plural, distributive) and one of their combinations (i.e. nondistributive) on a single scale called the collocation-dispersion scale, as follows: The singular and the distributive are viewed as constituting the two end points; the plural is viewed as constituting the midpoint between the singular and the distributive. In the case of the nondistributive, since it is interpreted as a neutralization of the singular and the plural and since the representative of the neutralized opposition is neither the singular nor the plural but an intermediate term, it is viewed as constituting an intermediate point on the collocation-dispersion scale between the singular and the plural.

The cognitive feature of potentiality for grouping in a single locus (i.e. the cognitive feature pertaining to the ramifications of the cognitive content) allows one to place on the collocation-dispersion scale the other combination of the members of the category of nominal number, namely, the nonsingular.

The latter is viewed as constituting one endpoint of the collocation-dispersion scale together with the distributive, for the following reasons: On the one hand, the nonsingular is interpreted as a neutralization of the plural and the distributive (see discussion of pattern 1 in section 3.2.1.3.1.2. above). On the other hand, the cognitive feature of potentiality for grouping in a single locus reveals that the representative of the neutralized opposition is the distributive since, by applying only to entities which do not have the potentiality for grouping in a single locus (see section 3.2.3.1.3. above), the nonsingular implies several entities in several loci, as does the distributive.

The collocation-dispersion scale includes therefore the following four points: (1) singular, (2) nondistributive, (3) plural and (4) distributive together with nonsingular. To each point on the scale correspond(s) the subclass membership status(es) that determine(s) a given manifestation of the category of nominal number. Thus, to singular correspond mass, individual type 1, individual type 2 and mixed statuses; to nondistributive correspond aggregate and mixed statuses; to plural corresponds only individual type 1 status; to distributive and nonsingular correspond mass, aggregate, individual type 1, individual type 2 and mixed status. When the scale is viewed in terms of locus, it breaks in two. The portion of the scale that involves single locus exhibits varying degrees of collocation. The portion of the scale that involves multiple loci exhibits a single degree of dispersion. Three degrees of collocation correspond to the three points on the scale in the portion involving single locus. These are: total collocation corresponding to singular, two degrees of partial collocation corresponding to nondistributive and plural respectively.

The degrees of collocation and of dispersion that correspond to a given status can be ascertained on the basis of the various positions that this status occupies on the collocation-dispersion scale. They are as follows: To mass status and individual type 2 status correspond total collocation and total dispersion; to aggregate status correspond the first degree of partial collocation and total dispersion; to individual type 1 status correspond total collocation, the second degree of partial collocation and total dispersion; to mixed status correspond either total collocation and total dispersion or partial collocation and total dispersion.

The respective positions of the various subclass membership statuses on the collocation-dispersion scale are shown on figure 5.

3.2.3.3.2. Specification of the part played by the cryptotype of animateness

In the course of the analysis detailed in the preceding sections, the cryptotype of animateness was shown to have two functions connected with the category of nominal number: a diagnostic function and a qualifying function. The diagnostic function of animateness consists in differentiating between mass versus nonmass subclass membership statuses (see section 3.2.3.1.2.2.). The qualifying function of animateness consists in providing an additional differentiation of the relation of entities referred to by naming units with nonmass statuses to their respective loci in terms of the capacity for volition of the pertinent entities (see section 3.2.3.2.3. above). The relevance of the two functions of the cryptotype of animateness to the cognitive content of the category of nominal number was shown to be as follows: The diagnostic function of the cryptotype is relevant to the cognitive content of the category of nominal number. It provides the basis for inferring the cognitive distinctive feature assumed to have bearing on the manifestations of the category of nominal number, namely, potentiality for grouping in a single locus. The qualifying function of the cryptotype of animateness, on the other hand, is not relevant to the cognitive content of the category of nominal number. Capacity for volition does not affect the manifestations of the category of nominal number.

Through these two functions, the cryptotype of animateness indicates a connection between the cognitive problem of multiplicity and that of identity (see sections 4.2.1.1. below).

3.2.4. Application of step 4 in revised version of the Case Study

The two parts of step 4 will now be considered in turn as they apply to the property of fusion in Papago.

3.2.4.1. First part of step 4

The tasks pertaining to the first part of step 4 include (1) identifying the additional grammatical variables as well as the associated cultural variables, (2) ascertaining the grammatically-derived distinctive features and (3) establishing the grammatical ramifications of the cognitive content of the degrees of fusion investigated in the Case Study of the fusional statuses of naming units.

3.2.4.1.1. Additional grammatical variables and associated cultural variables of the property of fusion

As in the Follow-up Study, in the revised version of the Case Study only additional grammatical variables are considered. Associated cultural variables suggested themselves but were not included in the analysis (see section 3.2.1.2. above).

3.2.4.1.1.1. Additional grammatical conditions of variation

The additional grammatical conditions of variation that suggest themselves are the various types of modifier-head constructions characterizing the grammatical internal structure of naming units in the pertinent data.[75] These modifier-head constructions belong to two types of modifier-head relations each one of which in turn includes several types of constructions. The two types of modifier-head relations are called possessive modifier-head relation and attributive modifier-head *relation*, respectively.

They can best be distinguished in terms of their semantic content: in a possessive modifier-head relation, the semantic relation between head and modifier is that of possessor and possessed, as in *tokthoḍ-kii* "cobweb (lit.: spider--house)", another example is *hiañ-jeg=ga* "tarantula's burrow (lit.: tarantula--hole-in-the-ground=belonging-to)"; in an attributive modifier-head relation, the semantic relation between head and modifier is that of qualified and qualifier, as in *ʔuvï ʔalidag* "daughter (lit.: adult-female man's-child)"; another example is *Navait-ʔIʔi=dag* "Wine Drinking Ceremony (lit.: cactus-wine--drinking=of)".

3.2.4.1.1.2. Pertinence of the various types of modifier-head constructions

In line with the criterion for pertinence stated in section 3.2.2.1. above, the pertinence of the various types of modifier-head constructions to the cognitive analysis of the property of fusion depends on whether or not they can serve to form sets of naming units displaying a contrastive distribution of the initial variable, namely, compound status and multibase status on the one hand, single lexeme status and lexeme cluster status, on the other hand.

The various construction types, within the two modifier-head relations listed above, provide the organizing principle for grouping the naming units of the pertinent data into as many sets as there are construction types in each modifier-head relation.

Two construction types common in each relation are the following: type 1, in which the modifier precedes the head; type 2, in which the head precedes the modifier. Thus the construction type of the Papago term for "rock crystal" differs in two of the main dialects while its relation type remains the same, namely attributive. In one dialect "rock crystal" is called tonḍa=m-hodai (lit.: with=a-shine--rock)", a type 1 construction; in the other dialect it is called hodai-tonḍa=m (lit.: rock--with=a-shine)", a type 2 construction.

These sets display a contrastive distribution of the initial variables. Consequently, the various types of modifier-head constructions constitute additional grammatical variables.

3.2.4.1.2. Grammatically-derived secondary semantic distinctive features of the property of fusion

As was stated in section 2.1.4.2. above, grammatically-derived secondary semantic distinctive features are derived from the additional variables (see Diagram I). In the case of the property of fusion they are derived as follows: From each one of the sets formed with the additional variables naming units contrasting in terms of the initial variables (the two degrees of grammatical fusion and two degrees of lexical fusion) are sampled and examined.

An inspection of their meaning variants reveals two semantic patterns. The first pattern emerges from a comparison of naming units exhibiting either compound status or multiword status. It reveals the following distinctions: Compound, as opposed to multiword, status is characteristic of two types of naming units. The first type includes naming units referring to cultural items which either are indigenous rather than borrowed, or else were introduced earlier into Papago culture. Examples are the Papago names for various varieties of "melon seeds" (as for instance, *toota-kaikam* "ones with white seeds [lit.: white--seeded-one]") or varieties of "wheat" (as for instance, *cin͠vokam-pilkañ* "bearded wheat [lit.: bearded-one--wheat]"), which are compounds, as opposed to the name for "giraffe" (*cev kusvokam* "one with a long neck [lit.: long necked-one]"), which is a multiword unit. The second type includes naming units referring to items with which the Papagos are more familiar, and which are therefore used more frequently. Examples are the Papago name for "tablecloth" (*miisa-daam-taḍñim*" [lit.: table--on-top--spreading-one]"), an item of everyday use, which is a compound, as opposed to the name for "bedspread" (*vo?ikuḍ daam taḍñim* [lit.: bed on-top spreading-one]"), which is a multiword unit.

In summary, then, the pattern relating to compound status as opposed to *multiword status* examplified above, suggests that compound status is associated with two factors that affect the grammatical fusional status of naming units. These are: (1) *oldness of usage* and (2) *frequency of usage*.

The second semantic pattern emerges from comparison of naming units exhibiting either single lexeme status or lexeme cluster status. It reveals the following distinctions:

Single lexeme, (as opposed to lexeme cluster), status is characteristic of naming units referring to culturally prominent items.

An example of a single lexeme is the term for "cotton sack", *toki-kostal*, which refers to the special sack used in picking cotton, an institutionalized activity.[76] Note that sacks used in picking other crops do not have compact names of this sort. The naming units referring to these names are lexeme clusters. Such is the case also with the lexical set of names of sacks serving as containers, such as *cu?i-kostal* "flour sack" and *baabas—kostal* "potato sack".

Thus, the pattern relating to single lexeme status as opposed to lexeme cluster status exemplified above, suggests that single lexeme status is associated with one factor that affects the lexical fusional status of naming units. This is *cultural prominence*. The three factors specified above enter into three oppositions in terms of which naming units can be differentiated.

The three oppositions are assumed to be gradual ones: Each opposition, therefore is interpreted as being constituted by a pair of semantic distinctive features (see section 2.2.2.2. above).

This yields three pairs of semantic distinctive features. These are: pair 1: ancient versus recent usage; pair 2: frequent versus rare usage; pair 3: high versus low cultural prominence.

Since, furthermore, each feature is derived from the additional grammatical variables (i.e., types of modifier-head constructions) and characterizes the initial variables, the three pairs of features are said to constitute the grammatically-derived secondary semantic distinctive features of the property of fusion (see Diagram V).

A list of the factors relevant to the manifestations of the property of fusion, with the semantic distinctive features that correspond to them, is given in figure 6.

In summary: the property of fusion has three pairs of grammatically-derived secondary semantic distinctive features: ancient versus recent usage, frequent versus rare usage and high versus low cultural prominence.

3.2.4.1.3. Grammatical ramifications of the cognitive content of the property of fusion.

As was stated in section 2.1.5 above, these are constituted by the relation of the grammatically-derived secondary semantic distinctive features to the primary semantic distinctive features and to the underlying concept (see Diagram I~~X~~ 9). Consequently, the grammatical ramifications of the cognitive content of the property of fusion are constituted by the relation of the pairs ancient versus recent usage, frequent versus rare usage and high versus low cultural prominence to lexical analogy potential, on the one hand, and to the concept of individualness, on the other hand (see Diagram V).

In regard to the first of these relations, it is proposed that the three pairs of secondary semantic distinctive features (ancient versus recent usage, frequent versus rare usage and high versus low cultural prominence) are related to the primary semantic distinctive features of lexical analogy potential) as follows: the former constitute some of the factors that seem to contribute to changes in the latter.

It is further proposed that a change in the lexical analogy potential of entities referred to by multibase naming units is accompanied by a corresponding change in the grammatical fusional status of these naming units. The latter change is manifested through a grammatical process called base fusion. The process of base fusion refers to the acquisition by some naming units of a progressively higher degree of grammatical fusion.[77]

Manifestations of the process of base fusion were observed only incidentally in the course of the Case Study.[78] They allow one, however, to identify three separate — but not mutually exclusive — grammatical processes entering into base fusion and from now on referred to as fusional processes. These are: (1) compounding, (2) truncation and (3) abbreviation. The three fusional processes will now be briefly discussed in turn.

Compounding refers to the tendency of some multiword naming units to become multibase single words, i.e., compounds.

An example of a multiword unit is cev kusvokam "giraffe". An example of a morphologically related compound is toota-kaikam "~~type of wheat~~ a variety of melon seeds" (lit.: white-seeded-one). It is assumed that the compound originally was a multiword unit.

Truncation refers to the tendency of certain naming units, irrespective of their grammatical internal structure (i.e. either multibase naming units with multiword or compound status or single-base naming units), to become shortened through the omission of a short phonological segment, the morphological function of which remains to be ascertained.[79]

Examples of truncated forms are: *vosma-jeʔe* "father-in-law ←→ daughter-in-law" and *kaʔama-jeʔe* "mother-in-law ←→ daughter-in-law". The truncation of these forms is apparent from other morphologically related examples in which the added phoneme ḍ appears: *baʔamaḍ-ʔoog* "father-in-law ←→ son-in-law".

Abbreviation refers to the tendency of certain multibase naming units (i.e. with either multiword or compound status) to suffer a reduction in the number of their bases.
Examples are the following naming units:

Çukud Kuuk (lit.: owl has-hooted [with locative implied]) which can be shortened to Kuuk; the name of the Wine Cermony, Navait--ʔIʔidag, which can be shortened to ʔIʔidag.[80]

It is not unreasonable to expect that there might be a correlation between the three fusional processes entering into base fusion and the three pairs of secondary semantic distinctive features specified above. This expectation would be confirmed if ← · it could be shown that, for instance, compounding is promoted by ancient usage and restrained by recent usage. The suggested correlation appears to be quite complex and requires further investigation.

In the above, it has been proposed that the relation of the three pairs of secondary semantic distinctive features to the primary semantic distinctive feature (lexical analogy potential) consists in the contribution made by the former to changes in the latter.

In line with the theoretical framework presented in section V, the bearing of changes in the

2.1.5. above

lexical analogy potential of entities referred to by multibase naming units on the concept of individualness will now be discussed.

As was shown in section 3.2.1.4.2. above, there seems to be an inverse relation between lexical analogy potential and the concept of individualness: entities *with* lexical analogy potential are endowed with a *smaller* measure of individualness than entities *without* lexical analogy potential. It is proposed that a change in the lexical analogy potential of entities results in a corresponding change in the measure of individualness attributed by the culture to these entities. On the one hand, losing its lexical analogy potential, an entity becomes endowed with a greater measure of individualness. On the other hand, an entity acquiring the lexical analogy potential becomes endowed with a smaller measure of individualness. It is further proposed that to change — i.e., increase or decrease — in the measure of individualness attributed by the culture to entities referred to by multibase naming units, there corresponds a cognitive process called *individualness acquisition* which is assumed to constitute a gradual opposition. The detailed functioning of this process remains to be further investigated. The bearing of individualness acquisition on the concept of individualness is as follows: the manifestations of the concept of individualness through the property of fusion seem to vary in terms of the cognitive process of individualness acquisition. Consequently, the latter process pertains to the grammatical ramifications of the cognitive content of the property of fusion. Furthermore, since this process is assumed to enter into a gradual opposition, it is interpreted as being constituted by a pair of cognitive distinctive features (see section 2.2.2.2. above). The two features that correspond to the two terms of the opposition are *individuation* and *disindividuation*.

In summary: The two cognitive distinctive features of individuation and disindividuation constitute the grammatical ramifications of the cognitive content of the property of fusion.

3.2.4.2. Second Part of Step 4

The tasks pertaining to the second part of step 4 include (1) identifying the additional lexical variables as well as the associated cultural variables, (2) ascertaining the lexically-derived as well as culturally-derived secondary semantic distructive features and (3) establishing the grammatical ramifications of the cognitive content (see section 3.2.2. above).

3.2.4.2.1. Additional lexical variables and associated cultural variables

As in the Follow-up Study, in the revised version of the Case Study, only additional lexical variables are considered. Associated cultural variables suggested themselves but were not included in the analysis (see section 3.2.1.2. above).

3.2.4.2.1.1. Additional lexical conditions of variation

The additional lexical conditions of variation that suggested themselves are the various folk-taxonomic classes represented in the pertinent data, such as plant names, kinship terms, etc. These folk-taxonomic classes provide the organizing principle for grouping the naming unity of the pertinent data into sets. This yields as many sets as there are folk-taxonomic classes.

3.2.4.2.1.2. Pertinence of folk-taxonomic classes

In line with the criterion for pertinence stated in section 3.2.2.1. above, the pertinence of the folk-taxonomic classes to the cognitive analysis of the property of fusion depends on whether or not they can serve to form sets of naming units displaying a contrastive distribution of the initial variables (the 2 degrees of grammatical fusion and the 2 degrees of lexical fusion).

Since the answer is affirmative, the various folk-taxonomic classes represented in the pertinent data constitute additional lexical variables of the property of fusion in Papago. Four folk-taxonomic sets were sampled for the purpose of the Case Study. They are those constituted by naming units referring to plants, animals, places and kinship ties respectively. These sets constitute the lexical frame of reference within which the distribution of the initial variables can be observed.

3.2.4.2.2. Lexically-derived secondary semantic distinctive features, of the property of fusion.

From each one of the sets formed with the additional variables, naming units contrasting in terms of the initial variables (i.e. the 2 degrees of grammatical fusion and the 2 degrees of lexical fusion) were sampled and examined.

An inspection of the meaning variants of these naming units reveals three patterns relating to grammatical fusion and one pattern relating to lexical fusion.

The patterns relating to grammatical fusion are exemplified with naming units pertaining to all four of the folk-taxonomic sets. The pattern relating to lexical fusion is exemplified with naming units pertaining a single folk-taxonomic set, namely, kinship terms. Consequently the latter set serves to exemplify both a pattern relating to grammatical fusion and a pattern relating to lexical fusion.

The three patterns relating to grammatical fusion will be discussed first. The first pattern relating to the grammatical fusional status of naming units consists of the following distinctions: Naming units refering to plants and to animals are compounds rather than multiword units, unless they are of both relatively recent and relatively rare usage.

Examples of naming units of unambiguously ancient usage which are compounds rather than multiword units are the following plant names: ban-viivga a variety of wild tobacco (lit.; coyote--tobacco's), and ko?ovĭ-taatam desert senna (lit.: rattlesnake--teeth).

Examples of naming units of unambiguously recent but frequent usage which are compounds rather than multiword units are the following plant names (both of which are partial loans from Spanish): julaxañ-?uus peach tree (from Spanish durazno "a variety of peach") and piilos-?uus pear tree (from Spanish pera "pear").

Examples of naming units of unambiguously recent and rare usage which are multiword units rather than compounds are the following animal names: xuudagĭ ?e?ed nakxal "lobster (lit.: water inside scorpion)" and cev kusvokam "giraffe (lit.: long necked-one)".

The following example displays an interesting contrast between variant forms of the same naming unit, all of which are of recent usage but one of which is of more frequent usage than the others. Thus, miscin-kooji "peccary (lit.: wild--pig)" is a compound whereas do?agĭ?ab kooji also meaning "peccary (lit.; mountain-on pig)" is a multiword unit. Both naming units are unambiguously of relatively recent usage since *kooji* is a loan from Mexican Spanish cochi "pig". Whether one naming unit is of more recent usage than the other could not be ascertained, but it is not doubtful that *misciñ - kooji* is of more frequently usage than *doʔagtʔab kooji*, at least to the informant who volunteered both naming units. In the case of the naming units of less frequent usage the informant admitted ignorance as to its exact form. Thus, in addition to *doʔagtʔab kooji*, two variants were hesitantly suggested. These are *doʔagcʔeḑ kooji* (lit.: mountain-inside pig) and *doʔag ʔeḑ kooji* (lit.: mountain inside pig).81

The first pattern relating to the grammatical fusional status of naming units examplified above confirms one of the observations made in section 3.2.4.1.2. above: compound status seems to be affected by the two factors of *relative oldness of usage* and *relative frequency of usage*.

The second pattern relating to the grammatical fusional status of naming units reveals the following distinctions: Place names show a great deal of variation in grammatical fusional status, both when responses collected from the same informant at different times, and those collected from various informants, are compared. The degree of familiarity with the locality seems to be an important factor. If the informant was familiar with the place, the place name was either consistently a compound or consistently a multiword unit. If, on the other hand, the informant was not familiar with the place, his responses were quite inconsistent. When pushed, he would claim ignorance of both the "correct" form and the location itself. An example of such vacillation in the use of *Ceedagĭ-Vavhai=~~t~~=?am*, a compound, and of *Ceedagi Vavhai ?am*, a multiword unit, to designate the same locality, namely, Pozo Verde (see *footnote 54*).

The instability of the grammatical fusional status ←——————— (either compound or multiword) of some naming units examplified above is interpreted as being due to a *recent and abrupt change in Papago daily life* resulting from contact with an urban culture here called acculturation. The Papagos have recently acquired rapid means of transportation which give them a much greater mobility than in former times. As a consequence, people are now in touch with many unfamiliar surroundings and, therefore, with their names. It is proposed that unfamiliarity with a place is reflected in the instability of the grammatical fusional status of the naming units referring to that place.

The second pattern relating to the grammatical fusional status of naming units examplified above suggests that the latter may be affected by the factor of intensive acculturation.

The third pattern relating to the grammatical fusional status of naming units involves a restricted folk-taxonomic subclass of four self-reciprocal[82] kinship terms applying to eight in-laws. These are: vosma-jeʔe "father-in-law ↔ daughter-in-law (lit.: son-of-a-man's-child--mother)", kaʔama-joʔe "mother-in-law ↔ daughter-in-law (lit.: son-of-a-woman's-child--mother)", baʔamad̨-ʔoog "father-in-law ↔ son-in-law (lit.: daughter-of-a-man's-child--father)", mooms ha=ʔoog "mother-in-law ↔ son-in-law (lit.: daughter-of-a-woman's-children their=father)". The very last term, that for "mother-in-law ↔ son-in-law" is set off from the other three by being the only multiword unit among compounds.

The contrast in grammatical fusional status between the two terms involving son-in-law seems to be accounted for by the culture rules relating to the interaction of men with women as opposed to that of men with men. There is a lesser degree of interaction between men and women than there is between men and men. From this follows that there is less interaction between a son-in-law and his mother-in-law than between a son-in-law and his father-in-law, and consequently that the self-reciprocal term involving mother-in-law is used less frequently than the one involving father-in-law. To this cultural difference corresponds the particular grammatical contrast under investigation: the term involving father-in-law is a compound whereas that involving mother-in-law is a multiword unit.[83]

The third pattern relating to the grammatical fusional status of naming units examplified above confirms one of the observations made in section 3.2.4.1.2. above: compound status seems to be associated with the factor of relative frequency of usage.

The pattern relating to the lexical fusional status of naming units consists of the following distinctions: In the same subclass of kinship terms the inventory of which is listed immediately above, the last two terms, namely those for "father-in-law <—> son-in-law" and "mother-in-law <—> son-in-law" are single lexemes, the first two terms are lexeme cluster.

The contrast in lexemic fusional status seems to be accounted for by the cultural rule of patrilocal residence. The latter means that a daughter-in-law lives close to her in-laws, whereas a son-in-law not only lives far away from his in-laws but takes their daughter away from them. To this cultural difference corresponds the particular lexemic contrast under investigation: the two terms involving son-in-law are single lexemes, whereas those involving daughter-in-law are lexeme clusters.

The pattern examplified above confirms an observation made in section 3.2.4.1.2. above: single lexeme status seems to be associated with the factor of relative cultural prominence. The patterns relating to the grammatical and lexical fusional status of naming units that have been described above are relevant to the cognitive analysis of the property of fusion in two ways. On the one hand, they confirm the importance of three previously identified factors (see section 3.2.4.1.2. above), namely, relative oldness of usage, relative frequency of usage and relative cultural prominence. On the other hand, they reveal the importance of an additional factor, namely intensive acculturation.

From the discussion presented above the following conclusions can be drawn: (1) the factors of relative age of usage, relative frequency of usage and relative cultural prominence have already been assumed to enter into three gradual oppositions which in turn are constituted by three pairs of distinctive features. These were shown to be the grammatically-derived semantic distinctive features of the property of fusion (see section 3.2.4.1.2. above). Since, however, these features are here also derived from the additional lexical variables, they in addition constitute lexically-derived secondary semantic distinctive features. (2) The factor of acculturation is assumed to enter into an opposition of susceptivity to acculturation. Naming units the fusional status of which is affected by the factor of acculturation are said to be susceptible to acculturation. Naming units the fusional status of which is not affected by the factor of acculturation are said to be not susceptible to acculturation. Although no clearcut case of neutralization of the opposition of susceptivity to acculturation was observed, it is impressionistically interpreted as a privative opposition (see section 2.2.2.2. above). Consequently, a single semantic distinctive feature is assigned to it, namely, that of susceptivity to acculturation. Since at this stage of the analysis neither term of the opposition seems to be qualified, the feature of susceptivity to acculturation is said to be either present or absent. Since, on the other hand, this feature is derived from the additional lexical variables (folk taxonomic classes) and characterizes the initial variables, it constitutes a lexically-derived secondary semantic distinctive feature of the property of fusion (see Diagram V).

In summary: the property of fusion has three pairs of lexically-derived secondary semantic distinctive features which are also grammatically-derived and one secondary semantic distinctive features that is only lexically derived. The former are: ancient versus recent usage, frequent versus rare usage and high versus low cultural prominence. The latter is susceptibility to acculturation.

A list of the factors relevant to the manifestations of the property of fusion, with the semantic distinctive features that correspond to them, is given in figure 6.

3.2.4.2.3. Lexical ramifications of the cognitive content of the property of fusion

As was stated in section 2.3.5. above, these are constituted by the relation of the lexically-derived secondary semantic distinctive features to the primary semantic distinctive features and to the underlying concept (see Diagram I~~II~~7).

Consequently, the lexical ramifications of the cognitive content of the property of fusion are constituted by the relation of the pairs ancient versus recent usage, frequent versus rare usage, high versus low cultural prominence and the single feature of susceptibility to acculturation to the lexical analogy potential, on the one hand, and to the concept of individualness, on the other hand (see Diagram V).

The relation between the two types of semantic distinctive features specified above has two manifestations. The first manifestation concerns the relation of the three pairs of secondary semantic distinctive features to the primary semantic distinctive features. It is proposed that the relation which here emerges from a consideration of lexical factors is the same as that which has already emerged from a consideration of grammatical factors: the pairs ancient versus recent usage, frequent versus rare usage and high versus low cultural prominence constitute some of the factors that seem to contribute to changes in the lexical analogy potential exhibited by entities.

The second manifestation of the relation between the two types of semantic distinctive features concerns that of the single secondary semantic distinctive feature of susceptivity to acculturation to the primary semantic distinctive features of lexical analogy potential.

It is proposed that they are related as follows: under conditions of acculturation the lexical analogy potential of entities susceptible to acculturation seem to change at a faster rate than they would under different cultural conditions. The details of this relation remain to be investigated. Susceptivity to acculturation, therefore, can be said to constitute one of the factors that affect the rate of the changes in the lexical analogy potential exhibited by entities.

The manifestations of the relation between the two types of semantic distinctive features can be subsumed under two oppositions: an opposition of change in the lexical analogy potential of entities, an opposition of rate of change in the lexical analogy potential of entities.

The bearing of the first opposition has already been suggested in section 3.2.4.1.3. above: changes in the lexical analogy potential of entities can be characterized in terms of a pair of cognitive distinctive features, namely, individuation and disindividuation.

The second opposition, rate of change in lexical analogy potential, does not seem to have any bearing on the concept of individualness: the manifestations of the concept of individualness through the property of fusion do not seem to vary in terms of this condition. ~~On the other hand~~ It seems to have direct bearing on the two cognitive distinctive features of individuation and disindividuation. Thus, to a rapid rate of change in lexical analogy potential there seems to correspond an abrupt individuation or disindividuation. To a slow rate of change in lexical analogy potential there seems to correspond progressive individuation or disindividuation. The rate of change in lexical analogy potential, therefore, does not pertain to the lexical ramifications of the cognitive content of the property of fusion. It seems to serve as a qualification of the two cognitive distinctive features of individuation and disindividuation.

In summary, the lexical ramifications of the cognitive content of the property of fusion are the same as its grammatical ramifications: they consist of the two cognitive distinctive features of individuation and disindividuation.

3.2.4.3. Summary of the cognitive analysis of the property of fusion

The cognitive analysis of the property of fusion presented above has resulted in a specification of the cognitive significance of the property of fusion itself and of some of the conditions affecting its manifestations. The basic cognitive content has shown that the nonextreme fusional statuses of naming units reflect the pair of cognitive distinctive features of *high versus low lexical gestalt*. The ramifications of the cognitive content have shown that the factors determining the nonextreme fusional statuses of naming units reflect the pair of cognitive distinctive features of *individuation versus disindividuation*.

The analysis suggests that the grammatical fusional statuses of naming units are not pertinent to the basic cognitive content of the property of fusion. They are pertinent, on the other hand, to the grammatical ramifications of the cognitive content of the property of fusion. This seems to indicate that grammatical fusional statuses manifest a different underlying concept and, therefore, belong to another cognitive problem area than that of individualness. The cognitive problem area that suggests itself is one having to do with usage.

In addition, the cognitive analysis of the property of fusion presented above suggests a further hypothesis having to do with the universality of this linguistic property as well as that of its cognitive content.

It is proposed that in a given language the linguistic manifestations of the property of fusion can be characterized both in universal terms and in terms specific to that language. Instances of universal characteristics are those exhibited by the degrees of grammatical and lexical fusion manifested in compounds versus multiword units, single lexemes versus lexeme clusters. Instances of language-specific characteristics are those exhibited by the naming units with these various degrees of fusion.

It is suggested that in a given language-and-culture situational context the manifestations of the cognitive content of the property of fusion can also be characterized both in universal terms and in terms specific to that language-and-culture situational context.

The two pairs of cognitive distinctive features that emerged from the analysis of the property of fusion in Papago (high versus low lexical gestalt and individuation versus disindividuation) seems to be universal in the sense of applying to any language-and-culture situational context.[84]

In order to derive the cognitive content of the property of fusion that is specific to the Papago language-and-culture situational context, one would have to investigate in detail what particular Papago naming units exhibit the various cognitive distinctive features uncovered in the course of the Case Study.[85]

4. Testing the revised step sequence

The following sections are concerned with a detailed description of the manner in which the revised step sequence was tested.

The latter was applied to the same problem area as that constituting the original version of the Test Case (see section 2.3.1. above). This yielded a revised version of the Test Case, called the revised Test Case.

The test of the step sequence consisted in following, as literally as possible, the instructions given in each step in order to check their explicitness, their logical order and their generality.

The investigation conducted in the revised Test Case required further development of both the conceptual framework and the step sequence. These theoretical and methodological additions are discussed first and separately from the account of the revised Test Case itself. In the latter, the additions are integrated without further discussion.

4.1. Further development of conceptual framework and step sequence

The investigation conducted in the revised version of the Test Case led, on the one hand, to some observations concerning various types of relation between the variables, on the other hand, to some observations concerning the methodological import of the various types of relation previously shown to obtain between the naming units of the pertinent data and the aspect of language under investigation. These observations will now be discussed in turn.

4.1.1. Types of relation obtaining between the variables

Two types of relation were previously shown to obtain between the variables. The first type of relation is one of priority: the initial variables are investigated before the additional variables (see section 2.1.2.2. above). The second type of relation is one of subordination. It was thought to apply only to the relation between given linguistic variables and the cultural variables associated with them (see section 2.1.2.1. above).

The revised version of the Test Case led to (a) the extension of the relation of subordination to linguistic variables, and (b) the setting up of an additional relation between the variables, namely, that of interdependence.

The extension of the relation of subordination to linguistic variables allows a further differentiation between the latter, namely, that of cardinal linguistic variables versus associated linguistic variables: Several cardinal linguistic variables are on a par with each other. An associated linguistic variable is in a relation of subordination to a cardinal linguistic variable. So far only one instance of an associated linguistic variable has been observed: the cryptotype of animateness in the revised version of the Case Study.

The additional relation of interdependence applies to associated variables and to cardinal linguistic variables. It also allows a further differentiation between linguistic variables. Associated variables, either linguistic or cultural, and cardinal linguistic variables are always interdependent. Several cardinal linguistic variables of the same order of priority (either initial linguistic variables or additional linguistic variables) may be ~~, on the other hand,~~ either interdependent or unrelated to each other. In both the Follow-up Study and the revised version of the Case Study, the initial variables are interdependent (noun subclass membership statuses and degrees of grammatical and lexical fusion in sections 3.2.1.1. above). In the revised version of the Test Case, on the other hand, the initial linguistic variables are unrelated to each other (category of humanness and category of pronominal number in section 4.2.2.1.1.2. below).

The bearing of the distinction between interdependent versus unrelated variables on the application of the step sequence is as follows: Interdependent variables are investigated simultaneously by a single application of a given sequence of tasks. Unrelated variables ~~on the other hand~~, are investigated separately and concecutively by an iterative application of a given sequence of tasks (see section 2.3.3.2. above).

4.1.2. Methodological import of various types of relation between pertinent data and aspect of language under investigation

Two general modes of relation have been previously observed to obtain between the naming units of the pertinent data and the aspect of language under investigation (see section 3.1.2.1.2. above): Either the naming units of the pertinent data are themselves the carriers of the aspect of language under investigation, or else they are in a systematic relation (co-occurrence, replacement or opposition) with this aspect. The revised version of the Test Case led to a specification of the methodological consequence of such a distinction. If the naming units of the pertinent data are themselves the carriers of the aspect of language under investigation, the inferrence of the primary and secondary semantic distinctive features requires only two tasks each. The first task consists in forming sets with the naming units of the pertinent data by using the variables (either initial or additional) as a frame of reference. The second task consists in inspecting the meaning variants of the naming units included in these sets in order to infer the semantic distinctive features (primary or secondary) of the aspect of language under investigation. Steps 3 and 4 in both the Follow-up Study and the revised version of the Case Study illustrate this alternative (see sections 3.2.1.3.1., 3.2.1.3.2., 3.2.3.1.2., 3.2.3.2.2., 3.2.4.1.2. and 3.2.4.2.2. above).

If, on the other hand, the naming units of the pertinent data are not themselves the carriers of the aspect of language under investigation, the inference of the primary semantic distinctive features requires three tasks each. The first task is the same as before. It consists in forming sets with the naming units of the pertinent data by using the variables (either initial or additional) as a frame of reference. The second task consists in inspecting the meaning variants of the naming units included in these sets in order to infer the semantic distinctive features of the variables (initial or additional). These are the ancillary semantic distinctive features with respect to the aspect of language under investigation (see section 2.1.4.1. above). The third task consists in relating the ancillary semantic distinctive features to the aspect of language under investigation in order to infer the semantic distinctive features (primary or secondary) proper to that aspect. Step 3 in the revised version of the Test Case illustrates this alternative (see sections 4.2.2.2. below).

4.2. Application of the revised step sequence to the Test Case

For purposes of the Test Case, the investigation of the cognitive significance of the aspect of language chosen for the analysis is concerned only with the basic cognitive content of that aspect. Step 4 of the step sequence, the investigation of the ramifications of the cognitive content of that aspect of language, is not included. A diagram of the cognitive analysis conducted in the Test Case is shown on Diagram VIII.

The sequence of steps with, for each step, the instructions and their application to the Test Case is shown on Table IV. The two major phases of the step sequence (i.e. the specification phase and the analysis phase) will now be discussed in turn.

4.2.1. Specification phase

This phase includes instructions for formulating the cognitive problem area in step 1 and for specifying the pertinent data in step 2.

4.2.1.1. Step 1: Formulating the cognitive problem area

This step includes instructions for (a) selecting a linguistic aspect to be considered for investigation, (b) postulating the underlying concept, (c) specifying the cognitive problem area of which the linguistic aspect initially considered for investigation is a part, and finally (d) ascertaining whether the linguistic aspect initially considered for investigation coincides with the core of the problem area.

4.2.1.1.1. Selecting the linguistic aspect to be considered for investigation

The instruction is to select a highly recurrent linguistic aspect. The category selected for the Test Case is such a category. It is the grammatical category of person. This category includes three members, first person, second person, and third person, which occur either individually or in one combination.[86] The carriers of the category of person are the person markers. They coalesce, in the form of portemanteau morphs, with the markers of other grammatical categories in the personal pronouns.[87]

A list of the Papago personal pronouns with their translation equivalents in English as well as an indication of the various grammatical categories that are manifested in them, appears in figures 7 (7A, 7B, and 7C).

4.2.1.1.2. Postulating the underlying concept

The instruction is to postulate the underlying concept manifested in the linguistic aspect initially considered for investigation by applying the procedure described in detail in section 2.2.1. above. The underlying concept that suggests itself in connection with the category of person is the concept of identity. Its postulation is based on the range of meaning variation exhibited by the naming units that are affected by the three members of the category of person. These are the naming units that cooccur with and/or replace the latter (see section 4.2.1.2. below). They include naming units referring to every type of concrete entities differentiated in the Papago culture. The concept of identity, therefore, can be said to involve the essential characteristics that are attributed to entities by the Papago culture. As already stated in section 2.1.1. above, at this stage of the research only concrete entities can be taken into account.

4.2.1.1.3. Specifying the cognitive problem area

The instruction is first to delimit the scope of the cognitive problem area, then to determine its different facets as well as the sequence of analytic steps that correspond to them.

4.2.1.1.3.1. Delimiting the scope of the cognitive problem area

The instruction is to list all the linguistic aspects that manifest the concept of identity as specified in section 4.2.1.1.2. above. These linguistic aspects belong to the cognitive problem of identity. So far four grammatical categories and one set of lexical classes suggest themselves.

The four grammatical categories are: on the one hand, the category of humanness and the cryptotype of animateness (see sections 4.2.2.1.1. below), on the other hand, the noun subclass membership statuses of aggregate, individual, mixed, and mass (see section 3.2.1.1.1. above), and finally the noun subclass membership statuses of possessible and nonpossessible.[88]

The set of lexical classes is constituted by mutually exclusive folktaxonomic classes of concrete entities. Two such classes are that of *hemajkam* "human being(s)" and that of *ha?icu* "thing(s)" which includes animals, plants and objects.

The scope of the cognitive problem of identity appears to be as wide as that of multiplicity (see section 3.1.1.3.1. above). It is shown in Diagram IX.

4.2.1.1.3.2. Determining the facets of the cognitive problem area and the corresponding sequence of analytic stages

The instructions to follow in order to accomplish this task are discribed in detail in sections 2.1.6.2.1. and 2.1.6.2.2. above. The application of these instructions to the cognitive problem of identity results in the following specification: The core of this cognitive problem area is constituted by the major variations of the concept of identity as exhibited by both the category of person and the mutually exclusive folktaxonomic classes of concrete entities (see section 4.2.1.1.3.1. above). The secondary facets of the cognitive problem of identity are constituted by the category of humanness, the cryptotype of animateness, the noun subclass membership statuses of aggregate, individual, mixed, and mass, on the one hand, those of possessible and nonpossessible, on the other hand (see Diagram IX).

The initial stage in the investigation of the core deals both with the naming units that are positively relevant to the category of person and the mutually exclusive folktaxonomic classes of concrete entities. The subsequent stage in the investigation of the core deals with the naming units that are negatively relevant to the category of person.

The revised version of the Test Case is concerned only with a portion of the initial investigation of the core of the cognitive problem of identity, namely, that which involves the category of person.

4.2.1.1.4. Ascertaining whether the linguistic aspect initially considered for investigation coincides with the core of the problem area

The instruction is to retain the category of person for immediate investigation only if it coincided with the core of the cognitive problem of identity. As shown by the previous section, on the one hand, the category of person coincides with the core of the cognitive problem of identity together with the mutually exclusive folk-taxonomic classes of concrete entities, on the other hand it belongs to the grammatical dimension. In line with the general policy of always starting out with aspects of the grammatical dimension, the category of person is retained for immediate investigation.

4.2.1.2. Step 2 : Specifying the pertinent data

This step includes instructions for determining the pertinent data and for selecting a sample among these data.

4.2.1.2.1. Determining the pertinent data

The instruction is to determine what portion of the universe of data is pertinent to the initial investigation of the core of the problem area. The pertinent portion of the universe of data consists of the naming units which are positively relevant to the category of person. This includes two types of naming units: those in a relation of cooccurrence with, and those in a relation of replacement for, the personal pronouns which are the carriers of the category of person. These two types are referred to as the naming units corresponding to the personal pronouns.

4.2.1.2.2. Selecting a sample of pertinent data

The instruction is to make a random sampling of the pertinent data (see section 4.2.1.2.1. above) whenever such data is needed. The area to be sampled is specified in connection with the formation of sets in steps 3 and 4 below.

4.2.2. Analysis Phase

This phase includes instructions for the uncovering of the basic cognitive content of the category of person, in step 3, and that of its ramifications, in step 4. Only step 3 is discussed here.

4.2.2.1. Step 3: Uncovering the basic cognitive content of the category of person

This step includes three groups of instructions. The first group concerns the identification of the initial variables, first the initial linguistic variables, then, the associated cultural variables. The second group of instructions concerns the inference of the primary semantic distinctive features. The third group of instructions concerns the inference of the basic cognitive content of the category of person.

4.2.2.1.1. Initial linguistic variables

The instruction is to establish whether there are initial linguistic conditions of variation and to determine whether they are pertinent to the investigation.

4.2.2.1.1.1. Initial linguistic conditions of variation

The instruction is to ascertain whether the naming units of the pertinent data are affected by linguistic conditions of variation immediately connected with the category of person. In case of both grammatical as well as lexical conditions of variation being present, the instruction is to list the grammatical conditions of variation first. In the test case, only grammatical conditions of variation suggest themselves. They are the grammatical categories that coalesce with the category of person in the personal pronouns (see figures 7).

Among these grammatical categories two major types can be distinguished on the basis of the relation of their defining criteria to the clause functions, specifically, the subject and object functions.

Type 1 includes a single category defined in terms of its dependence on the clause functions. It is called the category of syntactic role. This category includes 3 members: subject role, object role and emphatic role.[89]

These 3 distinctive roles serve as the criteria for setting up the 3 inventories of personal pronouns shown in figures 7.

Type 2 includes the grammatical categories which have no relation to the clause functions. They are: (1) The category of *pronominal number* which includes 2 members: dispersed over several locations and nondispersed; (2) the category of *reflexivity* which includes 2 members: reflexive and nonreflexive; (3) the category of *indefiniteness* which includes 2 members: indefinite referent and nonindefinite referent; (4) the category of *objecthood* which includes 2 members: agent object and direct object; (5) the category of humanness which includes 2 members: human referent and nonhuman referent; (6) the category of specification which includes 2 members: precise referent and vague referent; (7) the category of location which includes 2 members: proximal referent and distal referent.

A list of the grammatical categories that are manifested in the personal pronouns appears in figure 8.

4.2.2.1.1.2. Pertinence of initial linguistic conditions of variation

The instruction is to determine whether the grammatical categories that coalesce with the category of person in the personal pronouns have bearing on the concept of identity. These grammatical categories can be grouped on the basis of their suspected semantic relationship to one another. This yields the following 5 groups:

Group I includes syntactic role reflexivity and objecthood; Group II includes indefiniteness and specificity; Group III includes location; Group IV includes humanness; Group V includes pronominal number.

The suspected bearing of each one of these groups on the concept of identity will now be examined in turn.

All three grammatical categories in Group I have to do with the relation of entities to actions, events or qualifications (see footnote 20 above). They involve roles played by entities in the act of communication, such as that of actor, agent and acted upon. They appear to have direct bearing, therefore, on such a cognitive problem as that of agency rather than on the concept of identity.[90]

The two grammatical categories in Group II involve the precision or vagueness with which reference to entities is made. They appear to have direct bearing, therefore, on such a cognitive problem as that of reference rather than on the concept of identity (see footnote 90 above).

The only grammatical category in Group III is location. It involves the position of an entity-or entities-in relation to a specified point of reference. The category of location, therefore, appears to have direct bearing on such a cognitive problem as that of orientation rather than on the concept of identity (see footnote 90 above).

The only grammatical category in Group IV is humanness. Since it involves the classification of entities as human and as nonhuman it has direct bearing on the concept of identity. It is pertinent, therefore, to investigate (a) what characteristics of entities are revealed by their classification as human versus nonhuman and (b) how these characteristics are related to the category of person.

The only grammatical category in Group V is pronominal number. It involves the classification of entities as dispersed and as nondispersed. As can be seen from some of the meaning variants of the carriers of the category of pronominal number (see figure 13), there is a relation between this category and the cryptotype of animateness.[91] It is proposed that the cryptotype be considered an associated linguistic variable of the category of pronominal number (see section 4.1. above).

Since animateness involves the classification of entities as animate and as inanimate it has direct bearing on the concept of identity. It is pertinent, therefore, to investigate (a) what characteristics of entities are revealed by their classification both as dispersed versus nondispersed and as animate versus inanimate and (b) how these characteristics are related to the category of person.

The grammatical categories that coalesce with the category of person in the personal pronouns, grouped on the basis of their suspected semantic relationship to one another, are shown in figure 9 with an indication of their bearing on the concept of identity.

In summary: Among the grammatical categories that coalesce with the category of person in the personal pronouns, only humanness and pronominal number together with its associated linguistic variable, the cryptotype of animateness, have direct bearing on the concept of identity. They constitute, therefore, the initial linguistic variables for the cognitive study of the category of person. Since the category of humanness and the category of pronominal number are not interdependent, they will be investigated separately (see section 4.1. above).

4.2.2.1.2. Initial cultural variables

The instruction is to ascertain whether there are any cultural variables associated, on the one hand, with the category of humanness, on the other hand, with both the category of pronominal number and the cryptotype of animateness.

In the case of the category of humanness it seems that the classification of entities as human versus nonhuman depends on certain culturally-defined factors. Thus, it seems that the distinctions between human versus nonhuman depends on whether the cultural context is that of a myth or tale or that of everyday life. In each of these cases, the distinctions depend further on whether the context is that of a dream, a vision, a trance or that of the waking state. The first pair of factors is that of folkloric reality versus workaday reality. The second pair of factors is that of dream state versus the waking state. A given cultural context is defined by a combination of one factor from each pair: the dream state and waking state of the folkloric reality, the dream state and waking state of the workaday reality.

These two pairs of factors, namely, folkloric reality versus workaday reality and dream state versus waking state, constitute the cultural variables associated with the category of humanness.

These two pairs of factors constitute also some of the cultural variables associated with the category of pronominal number and the cryptotype of animateness, with the following specification: They are relevant only when the semantic distinctive feature characterizing the latter categories is related to the category of person (see section 4.2.2.2.2.3. below).

With both the category of humanness and the category of pronominal number together with the cryptotype of animateness some additional cultural variables suggested themselves. They are the factors accounting for the fact that the manifestations of these categories may vary from speaker to speaker. This variation is attributed to cultural factors such as dialectal or other subgroup affiliation (see section 3.2.1.2. above). For purposes of the Test Case, this type of cultural variables is not considered in the analysis.

4.2.2.2. Primary semantic distinctive features of the category of person

In view of the fact that the naming units of the pertinent data are not the carriers of the category of person (see section 4.1.2 above) the tasks pertaining to the goal of uncovering the primary semantic distinctive features of the category of person are as follows: The first task is to form sets with the naming units of the pertinent data by using the initial variables as a frame of reference.

The second task is to inspect the inventories of these sets in order to uncover the semantic distinctive features of the initial variables themselves. The latter are the ancillary semantic distinctive features with respect to the category of person: The third task is to ascertain the relation of the ancillary semantic distinctive features [redacted] to the category of person.

The primary semantic distinctive features of the category of person derived, on the one hand, from the category of humanness and the cultural variables associated with it, and on the other hand, from the category of pronominal number and the associated cryptotype of animateness, will now be discussed in turn.

4.2.2.2.1. Primary semantic distinctive features of the category of person derived from the category of humanness and the associated cultural variables

The three tasks pertaining to the goal at hand can be specified as follows:

The first task is to form sets displaying the relation of the category of humanness to the associated cultural variables, with the naming units that correspond to the personal pronouns (see section 4.2.1.2.1. above).

The second task is to inspect the inventories of these sets in order to uncover what characteristics of entities govern their classification as human versus nonhuman (see section 4.2.2.1.1.2. above). These characteristics are semantic distinctive features of the category of humanness itself. They constitute, therefore, ancillary semantic distinctive features with respect to the category of person (see section 2.1.4.1. above).

The third task is to ascertain the relation of the ancillary semantic distinctive features to the category of person.

These three tasks will now be discussed in turn and in some detail.

4.2.2.1.1. Formation of sets

The task is to form sets displaying a classification of entities as human versus nonhuman with a sample of units that correspond to the personal pronouns. In view of the presence of cultural variables associated with the grammatical category of humanness (as specified in section 4.2.2.1.2. above) two types of sets displaying a classification of entities as human versus nonhuman can be formed. These are grammatically-defined sets and culturally-defined sets. The formation of each type of sets will now be discussed separately.

4.2.2.2.1.1.1. Formation of grammatically-defined sets

The grammatically-defined sets display the classification of entities as human versus non-human on the basis of the category of humanness itself.

The grammatically-defined sets include a sample of the naming units corresponding to the personal pronouns that are the carriers of the category of humanness. The latter are the personal pronouns of the type *heḍaʔi*, *heḍam* "someone, ones (specific)", for one of the two members of the category of humanness, and haʔicu "something, things (specific)", for the other member of this category (see figure 7B). These pronouns are interpreted as manifesting a cultural conception of reality called the grammatical reality.

The grouping of naming units as specified above yields one pair of grammatically-defined sets, namely, sets 1A and 1B. Set 1A includes naming units referring to entities grammatically defined as human. Set 1B includes naming units referring to entities grammatically defined as non‿human.

4.2.2.2.1.1.2. Formation of culturally-defined sets

The culturally-defined sets display the classification of entities into human versus non‿human in the four cultural contexts defined by the initial cultural variables (see section 4.2.2.1.2. above). This is called the cultural classification of entities into human versus nonhuman. The latter classification is operative, on the one hand, in the dream state and the waking state of folkloric reality, on the other hand, in the dream state and the waking state of workaday reality.

The formation of the culturally-defined sets requires two types of identification: (a) the identification of the four cultural contexts and (b) the identification of the cultural classification of entities into human versus nonhuman.

The basic technique for these two types of identification consists in the use of the folk-taxonomic labels for the *elicitation* and *collection* from texts of appropriate naming units. The folk-taxonomic labels utilized in this approach are of two types: general or specific. General folk-taxonomic labels are those designating broad classes of entities; whenever they are available, they are used in the elicitation of data.

Specific folk-taxonomic labels are those designating subclasses of entities — or individual members — of the broad classes defined by the general folk-taxonomic labels. In the collection of data from texts specific labels are used, in addition to general ones, whenever they occur.

In the elicitation of data, specific labels are used, instead of general ones, only when the latter are not available. For the task at hand, folk-taxonomic labels enter into the following two types of elicitation questions: questions serving to identify the context constituted by a given cultural variable (folkloric or workaday reality, dream or waking state) and questions serving to identify the status (human or nonhuman) of a given entity. The first type of question is called a context-identification question, the second a status-identification question.

The two pairs of cultural variables, folkloric and workaday reality, dream and waking state, are identified as follows: One member of each pair (namely, folkloric reality and the dream state) is defined operationally, the other member (namely, workaday reality and the waking state) is identified as that which the defined member is not.

The dream state is defined by using the folk-taxonomic label ceecʔk "to dream of (an entity)". This label enters into the context-identification question "Can you dream of X?"

Folkloric reality is defined as that which is described in folktales. These are unambiguously identified by the institutionalized activity of story-telling and thus require no folk-taxonomic label for their definition. The two major types of folktales in Papago are (a) the sacred tales (myths) which can only be told during the winter solstice, and (b) those which can be told at any time, such as the adventures of Coyote. No folk-taxonomic distinction seems to exist between the two types. Both are referred to by a variety of naming units, such as haʔicu ʔaaga "tale, story (lit.: something [act-of-being-] told)" or hoʔokʔaagida "witch tale, tale, story (lit.: witch--[act-of-being-] told-to-someone)".

In keeping with the cultural distinction, it may well be that folkloric reality should be further subdivided into sacred and nonsacred as well as traditional and recent.[92] However, for purposes of the Test Case this was not done.

In each one of the four cultural contexts specified above, the cultural classification of entities into human versus nonhuman is identified by utilizing folk-taxonomic labels that reveal such a classification. An instance is the folk-taxonomic label hemajkam "human being, person'. For purposes of the Test Case, statuses as to humaness that result from a change in identity due to magic --such as ʔebaʔagcud "to ~~turn (oneself)~~ be turned into an eagle" — are not considered.[93]

The elicitation and collection from texts of appropriate naming units for the purpose of forming the culturally-defined sets will now be discussed in turn.

The *elicitation* of appropriate naming units is done by means of two status-identification questions. The first question is relevant only to the waking state. It is constructed around the most general folk-taxonomic label available, namely *hemajkam* "human being, person". It reads as Follows: "Is X a '*hemajkam*'?" The second question is relevant only to the dream state. Its purpose is to ascertain what status a given entity can assume in a dream. It is constructed around the general folk-taxonomic label mentioned above (*hemajkam*) and includes, in addition, the verbal expression *hab ge maas* "to have the outward appearance of being something (without being it)", used in the syntactic frame *hab ge maas mo vud* . . . "to look as if one were a . . ." The question reads as follows: Does X look as if he were a '*hemajkam*'?"

The *collection* of appropriate naming units is done by means of the specific folk-taxonomic labels designating subclasses of hemajkam which occur in texts. In most cases such labels refer to entities which are designated by naming units separate from the labels themselves. Examples are: cioj "young man", cehia "young girl", ʔuvï "adult woman", keli "old man", ʔoks "old woman". In one case, the folk-taxonomic label is a part of the naming unit designating a given entity. The label is ʔoʔodham "people, man; adult man; Papago man". Examples Are: Jevho-ʔOʔodham "Gopher--Man", ʔUʔvhig-ʔOʔodham "Bird--Man (Men)", Xaxkaij-ʔOʔodham "Mirage--Man (Men)".

The answers to the context and status-identification questions and the occurrences in text of the folk-taxonomic labels, as indicated above, allow the cultural classification of naming units as human versus nonhuman.

The formation of the culturally-defined sets for each cultural context will now be discussed.

Dream state and waking state of folkloric reality. Using the available folkloric texts[94] as the source of information, the elicitation of naming units referring to entities culturally defined as human versus nonhuman proceeds as follows: All naming units designating entities encountered in the texts are subjected to the questions for the identification of the dream state and for status identification.

Using the same texts, the collection of naming units referring to entities culturally defined as human versus nonhuman includes (a) all naming units designating entities referred to by the specified folk-taxonomic labels (or of which the latter are part, see above), and (b) all naming units designating entities involved in dreams (i.e., both entities that have dreams and entities that appear in dreams).

The grouping of naming units as specified above, yields two pairs of culturally-defined sets, the pair 2A and 2B, and the pair 3A and 3B. Sets 2A and 2B include naming units defined as human and nonhuman, respectively, in the dream state of folkloric reality. Sets 3A and 3B include naming units defined as human and nonhuman, respectively, in the waking state of folkloric reality.

Dream state and waking state of workaday reality. Using a random sample of naming units designating entities belonging to workaday reality, the elicitation of naming units referring to entities culturally defined as human versus nonhuman proceeds as follows: All the naming units of the sample are subjected to the questions for the identification of the dream state and for status identification.

Using the available texts describing workaday reality,[95] the collection of naming units referring to entities culturally defined as human versus nonhuman entities includes (a) all naming units referred to by the specified folk-taxonomic labels (or of which the latter are a part), and (b) all naming units designating entities involved in dreams.

The grouping of naming units as specified above yields two additional pairs of culturally-defined sets, the pair 4A and 4B, and the pair 5A and 5B.

Sets 4A and 4B include naming units defined as human versus nonhuman, respectively, in the dream state of workaday reality.

Sets 5A and 5B include naming units defined as human versus nonhuman, respectively, in the waking state of workaday reality.

The relation of the five pair of sets to the variables (grammatical and cultural) that serve to define them is shown in figure 10.

Examples of entities referred to by naming units included in some of these sets appear in List 3.

4.2.2.2.1.2. Ancillary semantic distinctive features with respect to the category of person

In this case, they are the semantic distinctive features of the category of humanness itself. They are inferred from meaning variation assumed to correspond to distributional patterns exhibited by the naming units included in the sets formed with the category of humanness and its associated cultural variables.

An initial inspection of the inventories of these sets suggests characteristic patterns of distribution for the naming units that refer to entities having human status and those having non-human status in the four cultural contexts and in the grammatical reality. The following observations can be made concerning these patterns:

Observation 1

It seems that all entities classified as human in the grammatical reality (set 1A) are also classified as human in the four cultural contexts (waking state (set 5A) and dream state (set 4A) of workaday reality, waking state (set 3A) and dream state (set 2A) of folkloric reality).

Observation 2

It seems that all entities classified as nonhuman in the grammatical reality (set 1B) are also classified as nonhuman in the waking state of workaday reality (set 5B).

Observation 3

It seems that some of the entities that are classified as nonhuman in the grammatical reality (set 1B) may be classified as human in the dream state of workaday reality (set 4A) and/or either or both states of the folkloric reality (sets 2A and/or 3A). These observations suggest the following patterns of correspondence between the classification of entities in the three realities: (1) There seems to be a one-to-one correspondence between the inventories of the sets in both the grammatical reality and the waking state of workaday reality. (2) There is definitely no one-to-one correspondence between the inventories of the sets in the grammatical reality and those on the one hand, in the dream state of workaday reality and, on the other hand, in both states of the folkloric reality.

(3) It cannot be specified at this stage what pattern of correspondence exists between the inventories of the sets in the dream state of workaday reality and both states of the folkloric reality.[96] The following examples illustrate some of these patterns.[97]

The first group of examples illustrates the discrepancy between the inventories of the sets in the grammatical reality and those in the waking state of folkloric reality.

The examples consist of sentences referring to the waking state of folkloric reality, each of which displays both the grammatical and the cultural classification. Thus, the same naming unit is classified as nonhuman by the use of the personal pronoun ha icu "something (precise)" and as human by the use of one of the specified folk-taxonomic labels.

The examples are:

Haʔicu ʔux hab uḍ Hoʔok c ʔax uḍ ʔal ʔoks.
"It is a being (lit.: a thing) referred to as (lit.: hearsay) Hoʔok and she is said to be

(lit.: hearsay) a little old woman."

Haʔicu ʔux hab·uḍ ʔIʔitoi c ʔax uḍ ʔal keli. "it is a being (lit.: a thing) referred to as (lit.: hearsay) ʔIʔitoi and he is said to be (lit.: hearsay) a little old man."

Haʔicu ʔux hab uḍ Xaxkaij-ʔOʔodham. "They are beings (lit.: things) referred to as (lit.: hearsay) Mirage-Men."

The second group of examples illustrates the discrepancy between the inventories of the sets in the dream state of workaday reality and those in both the waking state of the same reality and the grammatical reality. The examples are based on Ruth Underhill's account of Papago culture.

She mentions instances of *animals* appearing in people's dreams in the shape of human beings. Thus, in his sleep the mule deer (*huavĭ*) appears to the hunter in the shape of a beautiful woman (Singing for Power, p. 55). The *eagle* appears to the young man who has killed him in the shape of a man (Singing for Power, p. 107).

Certain *natural objects* can also take the shape of human beings. Thus, a man is reported dreaming that he was given a song by the *morning* star who visited him in the form of a woman. (Author's field notes).

Certain objects that were parts of a person, such as the scalp of an enemy, or objects that are images of a person, such as the effigy of an Apache "in an Enemy Slayer's basket could take the form of a handsome man, and torment women with yearning." (Papago Social Organization, p. 184).

One instance of a plant taking a human shape is mentioned by Ruth Underhill. An unidentified root called jenaxaḍ "could assume the form of a man, enter a woman's house and cohabit with her, after which she would pine." (Papago Social Organization, p. 184).[98]

These particular examples have not been tested to find out with what pronouns the naming units referring to the entities mentioned in the examples would occur. It is very likely, however, that they would all cooccur with the nonhuman pronoun ha icu, just as the naming unit kokoi "ghost(s)" does in the following test sentence: Haʔicu ʔux hab uḍ kokoi. "They are beings (lit.: things) referred to as (lit.: hearsay) ghosts."

Initial interpretation

In attempting to give an initial interpretation of the meaning variation that can be assumed to correspond to the distributional patterns exhibited by naming units within the five sets formed with the category of humanness and its associated cultural variables, one major point stands out: the status as to humanness of some entities may change whereas that of other entities never changes.[99]

The conditions affecting the change -- and lack of change -- of status as to humanness exhibited by entities will now be discussed.

Observations one and three suggest that all entities which have human status in grammatical reality retain this status in the four cultural contexts.

Observations one, two, and three suggest that with entities which have nonhuman status in grammatical reality (a) all retain this status in the waking state of workaday reality; (b) some may undergo a change of status in the three other cultural contexts (dream state of workaday reality and both states of folkloric reality).

If the status as to humanness exhibited by entities in the grammatical reality is viewed as their inherent status and any status that is different from the inherent status is called an ascribed status,[100] two conditions suggest themselves as affecting the change -- and lack of change -- of status as to humanness.

The first condition has to do with the cultural contexts. In the waking state of workaday reality no change of status as to humanness is ever possible. In other words, all entities have their inherent status as to humanness.

In the dream state of workaday reality and in both states of the folkloric reality, with some entities a change of status as to humanness is possible. In other words, some entities have an ascribed status as to humanness.[101] The second condition has to do with the direction of the change. Whenever the status as to humanness of entities may change it changes from inherent nonhuman to ascribed human but not from inherent human to ascribed nonhuman.[102]

These conditions allow one to specify the status as to humanness of entities as follows: Entities that can have only inherent human status are said to be *unconditionally human*.

Entities that can have ascribed human status are said to be *conditionally human*.

Entities that can have only inherent nonhuman status are said to be *nonhuman*.

It is proposed that the above constitutes the meaning variation exhibited by the naming units that are affected by the category of humanness.

It is further proposed that this meaning variation allows one to differentiate entities referred to by these naming units on the basis of a single opposition, namely, *capacity for personhood*, as follows: Entities that are unconditionally human are said to be unconditionally capable of personhood.

Entities that are conditionally human are said to be conditionally capable of personhood.

Entities that are nonhuman are said to be incapable of personhood.

In view of the above the opposition of personhood is assumed to constitute a privative opposition (see section 2.2.2.2 above). Consequently a single semantic distinctive feature is assigned to it. This is *personhood*. Since at this stage of the analysis only the marked term of the opposition appears to be qualified, the feature of personhood is said to be either unconditionally present or conditionally present or absent.

In summary: Personhood is a semantic distinctive feature of the category of humanness itself. It is an ancillary semantic distinctive feature with respect to the category of person.

4.2.2.2.1.3. Relation of the feature of personhood to the category of person

This relation is to be ascertained by determing the patterns of correspondence (i.e. cooccurrence and/or replacement) between the naming units of the pertinent data classified on the basis of the feature of personhood and the three members of the category of person.

The determination of these patterns involves two tasks: (1) regrouping the naming units of the pertinent data on the basis of the feature of personhood; (2) ascertaining the relation of the naming units of the pertinent data regrouped on the basis of the feature of personhood, to the members of the category of person. These two tasks will now be discussed in turn.

4.2.2.2.1.3.1. Regrouping the naming units of the pertinent data

The regrouping of the naming units of the pertinent data on the basis of the feature of personhood yields three sets, namely, sets six, seven and eight. Set 6 includes the naming units that refer to entities with which the feature of personhood is unconditionally present. These are the entities having inherent human status in all cultural contexts. Set 7 includes the naming units that refer to entities with which the feature of personhood is conditionally present. These are the entities having inherent nonhuman status in some of the cultural contexts and ascribed human status in others. Set 8 includes the naming units that refer to entities with which the feature of personhood is absent. These are the entities having inherent nonhuman status in all cultural contexts.[103]

The three sets, with a sample of the naming units included in each one of them, are shown in figure 11.[104]

4.2.2.2.1.3.2. Ascertaining the relation of the regrouped naming units to the category of person.

It is proposed that the roles played by the entities participating in the act of communication can serve to characterize each member of the category of person. These roles, in turn, allow me to specify to what members of the category of person the naming units that refer to the entities playing them correspond (i.e. cooccur and/or replace). These roles are: those of addresser and addressee which can serve to characterize the first and second persons respectively; that of referent, further specified as the role of being neither addresser nor addressee, which can serve to characterize the third person.[105]

The relation of role to member of the category of person is established as follows: A naming unit that refers to an entity capable of playing the role of addresser is said to correspond to the personal pronouns manifesting the first person.

A naming unit that refers to an entity capable of playing the role of addressee is said to correspond to the personal pronouns manifesting the second person.

A naming unit that refers to an entity capable of playing the role of referent is said to correspond to the personal pronouns manifesting the third person.

In order to ascertain what roles given entities can play in the act of communication, the media through which the latter can take place in Papago culture have to be taken into account. These media include three not necessarily mutually-exclusive forms of verbal activity. These are speaking, singing and delivering ritual orations (the latter will from now on be referred to briefly as orating). Each of these three forms of verbal activity can be unambiguously identified on the basis of recognition criteria such as their respective style of delivery.

Speaking is the verbal activity corresponding to ordinary conversation and story telling. Singing is, in most cases, accompanied by dancing. It is in addition characterized by the use of a special esoteric style of language with its own phonological pattern.[106] According to Ruth Underhill, there are two types of ritual orations, ceremonial speeches and admonition speeches. Both types differ greatly from either conversation or singing. They have a peculiar vocabulary and a peculiar form of delivery.[107]

The determination of the roles that entities can play in the act of communication involves, therefore, two tasks: (a) the specification of the media through which the act of communication can take place, and (b) the identification of the roles that given entities can play in the act of communication when the latter is specified in terms of the media through which it can take place.[108]

The basic technique for these two tasks consists in the use of folk-taxonomic labels either alone or in conjunction with folk-taxonomic components[109] for the elicitation, and collection from texts, of appropriate data. As was the case with the previous utilization of folk-taxonomic labels, in the elicitation of data, general folk-taxonomic labels are preferred whenever they are in the collection of data from texts, specific folk-taxonomic labels are used in addition to general ones (see section 4.2.2.2.1.1.).

The elicitation and collection from texts of appropriate data will now be discussed in turn.

The elicitation questions aim at the determination of the roles that given entities can play in the act of communication the latter being further specified in terms of the media through which it can take place. These questions are called *role-determination questions*. In the role-determination questions folk-taxonomic labels are used either alone or in conjunction with folk-taxonomic components, as follows: Whenever a label is used without a component, it indicates both a medium and a role. Whenever a label is used with a component, the label indicates the medium, the component indicates the role.

Four folk-taxonomic components are utilized, two verbs and two postpositions, The verb *ʔaag* "to say something, to tell someone (to do something)" serves to identify the role of addresser. Both the verb *ʔaagid* "to tell something to someone" and the postposition "*ʔam vui* " to, toward someone/something" serve to identify the role of addressee. Finally, the postposition *ʔab ʔamjed* "from, about someone/something" serves to identify the role of referent.

All the folk taxonomic labels used without components are general labels. Thus, speaking and singing together with the role of addresser are identified by the two general labels *ñiok* "to speak" and *ñeʔe* "to sing [and dance]".[110] Singing together with the role of addresce are identified by the general label ñe?icud "to sing [and dance] (a song) for/to someone".

The folk-taxonomic labels used with components, on the other hand, include both general and specific labels. Thus speaking and the two roles of addressee and referent are identified by the general label ñiok "to speak" with the component ?am vui "to, toward someone/something" for the role of addressee and the component ?ab ?amjeḍ "from, about someone/something" for the role of referent.

Singing and the role of referent are identified by the general label ñe?e "to sing [and dance] (a song)" with the component ?ab ?amjeḍ "from, about someone/something".

In the case of orating, since no cover term seems to exist in Papago, specific folk-taxonomic labels designating types of orations have to be used. Examples of folk-taxonomic labels referring to various types of ceremonial speeches are: among the speeches recited for the occasion of the Rain Ceremony, Xuugaj Ñi?oki "Mockingbird Speech (lit.: like-a-mockingbird speech)", Melda Ñi?oki "Invitation Speech", and Melda ?am vui Voddva "Returning an Invitation (lit.: invitation there to/toward-him he-lays-it-down)"; among the speeches recited for the occasion of the Salt Pilgrimage, Shambdagï Ñi?okï "Mumbled Speech". An example of a folk-taxonomic label referring to admonition speeches is Ha?icu ha=xoobid "Things to be avoided (lit.: something someone=he-advises-against)".[111]

Orating and the three roles of addresser, addressee and referent are identified by the specific labels listed above with the component ?aag "to tell something/someone (to do something)" for the role of addresser, the component ?aagid "to tell something to someone" for the role of addressee and the component ?ab ?amjeḍ "from, about someone/something" for the role of referent. The folk-taxonomic labels and components used in the role-determination questions are shown in figure 12.

Three types of role-determination questions can be distinguished on the basis of the role that they aim at determining. They are addresser-determination questions, addressee-determination questions, and referent determination questions. The addresser-determination questions are as follows:

Can X "speak"?

Can X "sing"?

Can X deliver "an oration"?

The addressee-determination questions are as follows:

Can someone "speak to" X?

Can someone "sing to" X?

Can someone deliver "an oration to" X?

The referrent-determination questions are as follows:

Can someone "speak about" X?

Can someone "sing about" X?

Can someone deliver "an oration about" X?[112]

The collection of appropriate data from texts also involves the use of folk-taxonomic labels and components, but with the following modifications. (1) As previously stated, in addition to the most general labels available, some specific labels may also be used. The latter include (a) folk-taxonomic labels broadly synonymous with "to speak", such as both hab ce?e "to say something, to speak in a specified way ~~[illegible]~~ (for a short time)" and hab kaij "to say something, to speak in a specified way ~~[illegible]~~ (for a certain amount of time)" when followed by reported speech; (b) specific folk-taxonomic labels referring to the song cycles accompanied by dancing pertaining to certain important ceremonies, such as those of the Girls' Puberty Ceremony (*Vuagida*) which are called *Vuaga Ñe?i* "Girls'Puberty Songs [and dances] ". (2) Instead of the combinations of labels with components used in the elicitation questions, different combinations may be used with the same results. Thus, instead of the label ñe?e "to sing [and dance] " being used alone to indicate both a medium and the role of addresser, the same in formation can be conveyed by the combination of label with component *ñe?i ?aag* "to deliver a song [accompanied by dancing] ", in which *ñe?i* "song [accompanied by dancing] " is the label specifying the medium and *?aag* "to say something, to tell someone (to do something)" is the component indicating the role of addresser.

The application of the technique described above allows me to determine what roles the entities referred to by the naming units included in sets 6,7 and 8 can play in the act of communication. These roles, in turn, allow to ascertain the patterns of correspondence between the naming units included in sets 6,7 and 8 and the three members of the category of person.

4.2.2.2.1.3.3. Patterns of correspondence

An initial inspection of the inventories of sets 6, 7 and 8, with the roles that each entity can play in the act of communication being indicated, suggests definite patterns of correspondence between the naming units included in these sets and the three members of the category of person. The following observations can be made concerning these patterns.

Observation 1

It seems that the naming units referring to entities with which the feature of personhood is present -- unconditionally or conditionally -- (i.e. sets 6 and 7) can play the roles of addresser and/or addressee and/or referent. They correspond, therefore, to the three members of the category of person, namely, first person and/or second person, and/or third person.

Observation 2

It seems that the naming units referring to entities with which the feature of personhood is absent can be further differentiated as follows: Some naming units refer to entities exhibiting close association to entities with which the feature of personhood is conditionally present;[114] in this case, the feature is said to be present by extension.

Some naming units refer to entities exhibiting no close association with entities with which the feature of personhood is conditionally present; in this case the feature is said to be totally absent.

This further distinction shows that the unmarked term of the privative opposition of capacity for personhood is also qualified (see end of section 4.2.2.2.1.2. above). In line with the above, therefore, set 8 can be further subdivided into the two subsets 8A and 8B.

Subset 8A includes the naming units referring to entities with which the feature of personhood is present by extension. Subset 8B includes the naming units referring to entities with which the feature of personhood is unconditionally absent.

Observation 3

It seems that the naming units referring to entities with which the feature of personhood is present by extension (subset 8A) can play the roles of addresser and/or addressee and/or referent. They correspond, therefore, to the three members of the category of person, namely, first person and/or second person and/or third person.[115]

Observation 4

It seems that the naming units referring to entities with which the feature of personhood is unconditionally absent (subset 8B) can play only the roles of addressee and/or referent. They correspond, therefore, only to two members of the category of person, namely, second person and third person. They do not correspond to first person. For a sample of naming units illustrating these observations, see figure 11 and Lists 3.

Initial interpretation

From the observations presented above an initial interpretation can be attempted regarding the relation of the feature of personhood to the category of person.

Two patterns of correspondence between personhood and the category of person suggest themselves. They are as follows:

Pattern 1

To first person correspond entities with which the feature of personhood is present — either unconditionally, conditionally or by extension — but not entities with which this feature is totally absent.

Pattern 2

To second person and/or third person correspond to entities with which the feature of personhood is either present -- conditionally, unconditionally or by extension -- or totally absent.

These two patterns suggest that the ancillary semantic distinctive feature of personhood reveals one opposition between the members of the category of person. It is the opposition of first person versus nonfirst person.

The two terms of the opposition can be characterized on the basis of the feature of personhood as follows: The term first person requires the presence of the feature of personhood either unconditionally, conditionally, or by extension. The term nonfirst person on the other hand, does not require the presence — conditional, unconditional or by extension — of the feature of personhood.

In attempting to infer the semantic distinctive features that can account for the relation of the feature of personhood to the category of person as specified above, the following observation is relevant: The distribution of the two terms of the opposition first person versus nonfirst person within the two sets and the two subsets exhibiting the relation of the feature of personhood to the category of person sets off subset 8B as one including the only inventory of naming units that refer to entities incapable of playing the role of addresser in the act of communication. The following question, therefore, suggests itself: What are the characteristics of the entities referred to by the naming units included in subset 8B that distinguish them from the entities referred to by the naming units included in sets 6 and 7 and in subset 8A? It is proposed that the former entities can be distinguished from the latter on the basis of an opposition of *capacity for awareness*, as follows: Entities referred to by naming units included in sets 6 and 7 are viewed by the Papago culture as capable of *total awareness*. Entities referred to by naming units included in subset 8A are viewed as capable of *partial awareness*. Entities referred to by naming units included in subset 8B are viewed as *incapable of awareness*.

In view of the above, the opposition of capacity for awareness is interpreted as constituting a privative opposition (see section 2222 above). A single semantic distinctive feature, therefore, is assigned to it, namely, *awareness*.

Since, at this stage of the analysis, only the marked term of the opposition appears to be qualified, the feature is said to be either totally present, partially present, or else absent.

The feature of awareness pertains to the category under investigation and is derived from one group of interdependent initial variables. It constitutes, therefore, a primary semantic distinctive feature of the category of person (see Diagram VIII).

4.2.2.2.2. Primary semantic distinctive features of category of person derived from the category of pronominal number and the associated cryptotype of animateness

As was mentioned in section 4.2.2.1.2. above, for purposes of the Test Case, the cultural variables associated with both the category of pronominal number and the cryptotype of animateness (i.e. dialectal or other subgroup affiliation) are not considered in the analysis. The three tasks pertaining to the goal of uncovering the primary semantic distinctive features of the category of person that are derived from the category of pronominal number and the associated cryptotype of animateness can be specified as follows: The first task is to form sets displaying the relation of the category of pronominal number to the cryptotype of animateness with the naming units that correspond to the personal pronouns (see section 4.2.1.2.1. above). The second task is to inspect inventories of these sets in order to uncover what characteristics of entities govern their classification as dispersed versus nondispersed and as animate versus inanimate (see section 4.2.2.1.1.2. above). These characteristics are the semantic distinctive features of the category of pronominal number and its associated cryptotype of animateness. They constitute, therefore, ancillary semantic distinctive features with respect to the category of person (see section 2.1.4.1.above).

The third task is to ascertain the relation of the ancillary semantic distinctive features to the category of person.

These three tasks will now be discussed in turn and in some detail.

4.2.2.2.2.1. Formation of sets

The task is to form sets displaying a classification of entities both as dispersed versus nondispersed and as animate versus inanimate, with a sample of naming units that correspond to the personal pronouns.

Two specifications are required regarding the sample of naming units that should be included in the sets: (1) Among the personal pronouns carriers of the category of pronominal number, those involving the cryptotype of animateness include only the following three pairs: on the one hand, one pair of personal pronouns objects,[116] namely, *φ* "him, her, it, them (inanimate)" for nondispersed, *ha* "them" for dispersed; on the other hand, two pairs of emphatic personal pronouns,[117] namely, *?iida?a* "this, those (inanimate)" and *hega?i* "that, those (inanimate)", for nondispersed, *?idam* "these" and *hegam* "those", for dispersed. The personal pronouns carriers of the category of pronominal number are shown in *figure 13*.

(2) Among the naming units corresponding to the personal pronouns listed above, only those marked as to animateness should be considered. Naming units with mass status, being unmarked as to animateness (see section 3.2.3.1.1.2. above) are not pertinent to the task at hand.

In line with the above, the sample of pertinent naming units can be specified as including naming units which (a) correspond to the three pairs of personal pronouns listed above and (b) are marked as to animateness. These naming units are utilized to make up sets as follows: The various forms, citation form and/or derived forms(s) (see section 2.3.1. above) pertaining to the pertinent naming units are differentiated on the basis of (a) their status as to animateness and (b) their patterns of correspondence with the personal pronouns. This yields four sets.

Set 1 includes the forms pertaining to the pertinent naming units with *animate status* that correspond to the *nondispersed* personal pronouns ∅, *?iida?a*, *hega?i*. In this set the citation form alone is found, as with *?uvi* "woman".

Set 2 includes the forms pertaining to the pertinent naming units with *animate status* that correspond to the *dispersed* personal pronouns *ha*, *?idam*, *hegam*. In this set, either only a derived form is found, as with *?u?uvi* "women [in/of one or several groups or scattered]" or both the citation form and a derived form are found, as with *?o?odham* "men [in/of a single group]" and *?o??odham* "men [in/of several groups or scattered]".

Set 3 includes the forms pertaining to the pertinent naming units with *inanimate status* that correspond to the *nondispersed* personal pronouns ∅̣ , *?iida?a*, *hega?i*. In this set, either only the citation form is found, as with *?uupad* "catclaw, catclaws [in one group]", or both the citation form and a derived form are found, as with *kii* "house" and *kiiki* "houses [in one group]".

Set 4 includes the forms pertaining to the pertinent naming units with *inanimate status* that correspond to the *dispersed* personal pronouns, *ha*, *?idam*, *hegam*. In this set, only a derived form is found, as with *kiiki* "houses [in several groups or scattered]".

The four sets with a sample of the naming units included in each one of them are shown in *figure 14*.

The following examples illustrate how the citation form and/or the derived form(s) pertaining to given naming units are found to correspond to ~~the~~ [illegible] personal pronouns in texts.

Example 1.

...hega?i ?u?uvhig-nonha matp ?ab *ha*dadxa ?am *ha*naatok, hega?i viappoi. "...these bird eggs which he placed up there [in a nest] after he had made them [one after the other], that boy".

In this example, the dispersed pronoun *ha* contained in the verbs hadadxa and hanaatok corresponds to the citation form ?u?uvhig-nonha.

Example 2.

...bx ?ab ?i si xuuxud hega?i huha. "...[the crow] filled to the brim [and in one go] those baskets [in one location]"

In this example, the nondispersed pronoun Ø (zero morph) corresponds to the derived form huha.

4.2.2.2.2.2. Ancillary semantic distinctive features with respect to the category of person

In this case, they are the semantic distinctive features of the category of pronominal number and the associated cryptotype of animateness. They are inferred from the meaning variants exhibited by the naming units included in the four sets formed with the category of pronominal number and the cryptotype of animateness.

An inspection of these meaning variants, as illustrated in section 4.2.2.2.2.1. above and in figure 14, reveals the following pattern: Several animate entities are necessarily dispersed, whereas several inanimate entities are not necessarily dispersed. They may be either nondispersed, as with kiki "houses [in one group]"(set 3)or dispersed as with kiiki "houses [in several groups or scattered]" (set 4).

It is proposed that this pattern manifests an opposition of capacity for voluntary mobility. Entities referred to by the pertinent naming units can be differentiated on the basis of this opposition as follows: Entities with animate status are capable of voluntary mobility. Entities with inanimate status are incapable of voluntary mobility. The assumption is that the capacity for voluntary motion prevents several animate entities from being nondispersed whereas the lack of capacity for voluntary motion allows several inanimate entities to be nondispersed.[118]

The connection between animateness and the capacity for voluntary motion is illustrated by two contrastive sentences occurring in close proximity within the same portion of a myth, "The Creation of the World". The context is the following: the culture hero ʔIʔitoi is inspecting the shapes fashioned by his two helpers, Jevuḍ-Maakai and Coyote, before accepting them as human. Looking at one group of completed shapes he says, using the confined pronoun ʔiidaʔa: *Mo ʔom a sʔap hab hi a cuʔig, ʔiidaʔa.* "They are fine in my opinion, this (batch)." Later on, looking at another group of shapes which were fashioned with only one leg, he says: *ʔA kut has masma o ʔoiyod ʔidam c hab cuʔig?* "How on earth are these going to move, the way they are?" This time the extended pronoun *ʔidam* is used. The explanation proposed for the use of the extended rather than the confined pronoun in this context is the presence of the verb *ʔoiopo* "to walk, move around."[119] The mention of voluntary motion changes the categorization of the entities that are the antecedents of the pronoun from inanimate to animate, and hence the form of the pronoun from nondispersed to disperse.

The opposition of capacity for voluntary mobility is assumed to constitute a privative opposition. (see section 2222 above). Consequently a single semantic distinctive feature is assigned to it. This is voluntary mobility. Since this stage of the analysis neither the marked term nor the unmarked term of the opposition appears to be qualified, the feature of voluntary mobility is said to be either present or absent.

In summary: Voluntary mobility is a semantic distinctive feature of the category of pronominal number and the associated cryptotype of animateness. It is an ancillary semantic distinctive feature with respect to the category of person.

4.2.2.2.2.3. Relation of the feature of voluntary mobility to the category of person

This relation is to be ascertained by determining the patterns of correspondence (i.e. cooccurrence and/or replacement) between the pertinent naming units classified on the basis of the feature of voluntary mobility and the three members of the category of person.

The determination of these patterns involves two tasks: (1) regrouping the naming units of the pertinent data on the basis of the feature of voluntary mobility; (2) ascertaining the relation of the naming units of the pertinent data regrouped on the basis of the feature of voluntary mobility to the members of the category of person. These two tasks will now be discussed in turn.

4.2.2.2.2.3.1. Regrouping the naming units of the pertinent data

For the regrouping of the naming units included in the four sets formed with the category of pronominal number and the cryptotype of animateness (see section 4.2.2.2.1. above), one pair of folk-taxonomic labels denotating voluntary mobility is used.[120] The pair includes the folk-taxonomic labels ?oimmed (sg.s.) and ?oiopo (pl.s.) "to walk, move around" (see fn 119). The cooccurrence patterns of the pertinent naming units with this pair of folk-taxonomic labels vary in terms of the two pairs of factors constituting the cultural variables associated with the category of number and the cryptotype of animateness (see section 4.2.2.1.2. above). The technique for the identification of the cultural contexts constituted by the associated cultural variables is described in detail in section 4.2.2.2.1.1.2. above.

The cooccurrence patterns of the pertinent naming units with the folk-taxonomic labels specified above in these cultural contexts yields three sets, namely, sets 5,6 and 7.

Set 5 includes the naming units which cooccur with one -- or both members -- of the pair of folk-taxonomic labels in all cultural contexts. They are naming units referring to entities with which the feature of voluntary mobility **is** *unconditionally present*.

Set 6 includes the naming units which cooccur with one-- or both members -- of the pair of folk-taxonomic labels in some of -- but not all -- of the cultural contexts. They are naming units referring to entities with which the feature of voluntary mobility is *conditionally present*.

Set 7 includes the naming units which never cooccur with either member of the pair of folk-taxonomic labels. They are naming units referring to entities with which the feature of voluntary mobility is absent.

Further above (see section 4.2.2.2.2.2.) it was assumed that the feature of voluntary mobility enters into a privitive opposition. It was not possible, however, to specify whether either of the terms of the opposition is qualified. Since the presence of the feature of voluntary mobility is assumed to be the marked term of the opposition, the sets formed with the regrouped naming units show that the marked term of the opposition is qualified: the feature of voluntary mobility can be either unconditionally present or conditionally present.

The three sets of regrouped naming units with a sample of the naming units included in each, are shown in figure 15.

4.2.2.2.2.3.2. Ascertaining the relation of the regrouped naming units to the category of person

As previously stated (see section 4.2.2.2.1.3.2. above) the roles played by the entities participating in the act of communication serve to specify to what members of the category of person the naming units that refer to the entities playing these roles correspond (i.e. cooccur with and/or replace).

As also stated in the same section, the determination of the roles that entities can play in the act of communication involves two tasks: (a) the specification of the media through which the act of communication can take place, and (b) the identification of the roles that given entities can play in the act of communication when the latter is specified in terms of the media through which it can take place (see footnote108).

The basic technique for these two tasks is the one previously used in connection with the category of humanness. It is described in detail in section 4.2.2.2.1.3. above.

The application of this technique allows one to determine what roles the entities referred to by the naming units included in sets 5,6 and 7 can play in the act of communication. These roles, in turn, allow one to ascertain the patterns of correspondence between the naming units included in sets 5, 6 and 7 and the three members of the category of person.

4.2.2.2.2.3.3. Patterns of correspondence

An initial inspection of the inventories of sets 5,6 and 7, with the roles that each entity can play in the act of communication being indicated, suggests definite patterns of correspondence between the naming units included in these sets and the three members of the category of person.

The following observations can be made concerning these patterns.

Observation 1:

It seems that the naming units referring to entities with which the feature of voluntary mobility is *absent* (set 7) can be further differentiated as follows: Some naming units refer to entities exhibiting close association to entities with which the feature of voluntary mobility is present; in this case, the feature is interpreted as being *present by extension*.[121]

Some naming units refer to entities exhibiting no close association to entities with which the feature of voluntary mobility is present; in this case, the feature is interpreted as being *totally absent*.

This additional distinction shows that the unmarked term of the privative opposition in which the feature of voluntary mobility enters is also qualified (see end of section 4.2.2.2.2.2. and end of section 4.2.2.2.2.3.1. above).

In line with the above, set 7 can be further subdivided into two subsets, namely, subset 7A and subset 7B.

Subset 7A includes naming units referring to entities with which the feature of voluntary mobility is present by extension.

Subset 6B includes the naming units referring to entities with which the feature of voluntary mobility is totally absent.

Observation 2

It seems that the naming units referring to entities with which the feature of voluntary mobility is present, either unconditionally or conditionally (sets 5 and 6), can play the roles of addresser and/or addressee and/or referent. They correspond, therefore, to the three members of the category of person, namely, first person and/or second person and/or third person.

Observation 3

It seems that the naming units referring to entities with which the feature of voluntary mobility is present by extension (subset 7A) can play the roles of addresser and/or addressee and/or referent. They correspond, therefore, to the three members of the category of person, namely, first person and/or second and/or third person.

Observation 4

It seems that the naming units referring to entities with which the feature of voluntary mobility is totally absent (subset 7B) can only play the roles of addressee and/or referent. They correspond, therefore, only to two members of the category of person, namely, second person and/or third person. They do not correspond to first person. For a sample of naming units illustrating these observations, see figure 15.

Initial interpretation

From the observations presented above, an initial interpretation can be attempted regarding the relation of the feature of voluntary mobility to the category of person.

Two patterns of correspondence between voluntary mobility and the three members of the category of person suggest themselves. They are as follows:

Pattern 1: To first person correspond entities with which the feature of voluntary mobility is present -- unconditionally, conditionally or by extension -- but not entities with which the feature of voluntary mobility is totally absent.

Pattern 2: To second person and/or third person correspond entities with which the feature of voluntary mobility is either present -- unconditionally,

conditionally or by extension -- or totally absent.

These two patterns suggest that the ancillary semantic distinctive feature of voluntary mobility reveals the same opposition between the members of the category of person as was revealed by the feature of personhood (see section 4.2.2.2.1.3.3. above). It is the opposition of first person versus nonfirst person.

The two terms of the opposition can be characterized on the basis of the feature of voluntary mobility, as follows: The term first person requires the presence — unconditionally, conditionally or by extension — of the feature of voluntary mobility.

The term nonfirst person, on the other hand, does not require the presence — unconditionally, conditionally or by extension — of the feature of voluntary mobility.

In attempting to infer the semantic distinctive features that can account for the relation of the feature of voluntary mobility to the category of person, as specified above, the following observation isrelevant: The distribution of the two terms of the opposition first person versus nonfirst person within the one set and the two subsets exhibiting the relation of the feature of voluntary mobility to the category of person, sets off subset 7B as one including the only inventory of naming units that refer to entities incapable of playing the role of addresser in the act of communication. The following question, therefore, suggests itself: What are the characteristics of the entities referred to by the naming units included in subset 7B that distinguish them from the entities referred to by the naming units included in sets 5 and 6 and subset 7A? It is proposed that the former entities can be differentiated from the latter on the basis of an opposition of *capacity for motivation*, as follows: Entities referred to by naming units included in sets 5 and 6 are viewed by the Papago culture as capable of *total motivation*.

Entities referred to by naming units included in subset 7A are viewed as capable of *partial motivation*.

Entities referred to by naming units included in subset 6B are viewed as *incapable of motivation*.

In view of the above, the opposition of capacity for motivation is interpreted as constituting a privative opposition (see section 2.2.2.2 above). A single semantic distinctive feature, therefore, is assigned to it, namely, motivation.

Since, at the stage of the analysis, only the marked term of the opposition appears to be qualified, the feature is said to be either totally present, partially present or else absent.

The feature of motivation pertains to the category under investigation and is derived from one group of interdependent initial variables. It constitutes, therefore, a primary semantic distinctive feature of the category of person (see Diagram VIII).

4.2.2.3. Basic cognitive content of the category of person

The instruction is to establish the relation of the primary semantic distinctive features to the underlying concept. More specifically, it is to establish the relation of awareness and motivation to the concept of identity (see Diagrams I and VIII)

In attempting to relate awareness and motivation to the concept of identity it is important to note that there is a one to one correspondence between the two primary semantic distinctive features.

Thus, with entities with which the feature of awareness is totally present, the feature of motivation is also totally present; with entities with which the feature of awareness is partially present, the feature of motivation is also partially present; with entities with which the features of awareness is absent, the feature of motivation is also absent (compare inventories of sets in figures 11 and 15).

From the above it follows that the relation of awareness and motivation to the concept of identity has a single manifestation.

The latter is as follows: It is proposed that concrete entities that differ in terms of both awareness and motivation, also differ in terms of an opposition of ego endowment. i.e., of whether or not they are regarded by the culture as been endowed with an ego.

Thus, entities with which awareness and motivation are totally present, are regarded by the culture as being themselves totally endowed with an ego. Entities with which awareness and motivation are partially present, are regarded by the culture as being partially endowed with an ego. Entities with which awareness and motivation are absent, are regarded by the culture as not endowed with an ego.

Ego endowment, therefore, is assumed to constitute a qualified privative opposition.

The bearing of this opposition on the concept of identity is interpreted as follows: The expression of the concept of identity through the category of person requires a choice between the 3 members of this category (i.e. first person, second person, third person) on the basis of the qualified privative opposition of ego endowment.

Since this opposition is directly relevant to the concept of identity, it can be said to pertain to the basic cognitive content of the category of person.

Since, furthermore, the opposition is assumed to be a qualified privative one (see section above) a single cognitive distinctive feature is assigned to it. This feature is ego endowment.

In summary: The basic cognitive content of the category of person is constituted by the cognitive distinctive feature of ego endowment.

5. Themes and Theme structure

The preceding sections have presented a detailed account of the approach proposed for uncovering the cognitive contents of given aspects of language. As stated initially (see section 0.2. above) this constitutes the first of two major stages in the cognitive analysis of language.

The present sections deal with the second major stage. In this stage the objective is to infer, first, the themes of the language from related cognitive contents (see Diagram II), and subsequently the theme structure from the themes.

At this point in the research, the discussion of the second stage will have to remain programmatic. This means that only a general outline of the way to proceed in order to infer the themes of the language and the theme structure will be attempted at present. An approach comparable in depth with that proposed in order to meet the objective of the first major stage can only emerge as the result of extensive further research.

Before presenting the outlined approach for the second major stage in the cognitive analysis of language, the two major stages will be compared in terms of the analytic objectives proper to each and of the methodological apparatus necessary to meet them.

5.1. Relation of methodological apparatus to analytic objectives in the cognitive analysis of language.

The specification of the objectives proper to the two major stages of the cognitive analysis of language is based on the conception of structure held by the author. A structure is regarded as being made up of units and their relations. Two types of relations are distinguished: paradigmatic (i.e. relations of class inclusion) and syntagmatic (i.e. relations of arrangement). In terms of this conception of structure, the objective of any structural analysis is to ascertain the units as well as their relations, both paradigmatic and syntagmatic.

In the present case, the units of the structure under investigation are the themes of the language (see section 5.2. below). These units together with their paradigmatic and syntagmatic relations constitute the theme structure of the language.

It is proposed that in order to meet the objectives stated above, four tasks have to be accomplished successively.

The first task consists in identifying the basic information required for the cognitive analysis of language. This basic information is constituted by the cognitive contents of given aspects of the linguistic system.

The second task consists in inferring the themes of the language from related cognitive contents. As stated above, themes are the units of the theme structure of the language.

The third task consists in classifying the themes of the language into theme classes. This reveals one aspect of the theme structure of the language, namely, the paradigmatic relations that obtain between its units.

The fourth task consists in describing the arrangement patterns exhibited by the themes. This reveals another aspect of the theme structure of the language, namely, the syntagmatic relations that obtain between its units.

The relation between these tasks and the two major stages in the cognitive analysis of language is the following: the first major stage includes only task 1; the second major stage includes tasks 2,3 and 4.

The methodological apparatus needed to accomplish the tasks proper to the two major stages differs greatly in scope. As was shown by the description of the step sequence in the preceding sections, the approach proposed here for the identification of the cognitive contents of given aspects of language is very elaborate. As will be shown later, the methodological apparatus for the tasks of the second major stage is much less elaborate.

It is proposed that this difference is due to the different nature of the tasks. Task 1 requires the uncovering of previously unknown elements. These elements, furthermore, are far removed from the behavioral units from which they are ultimately derived (see section 2.1.1. above).[122] Tasks 2, 3 and 4, on the other hand, are concerned with the organization of previously identified elements.

5.2. From cognitive contents to themes

It is proposed that the minimal units of the aspect of the cognitive system that is manifested in language are the themes of the language: the latter are the first order of elements that are no longer in a one-to-one relation to the aspects of the linguistic system selected for cognitive analysis.

The cognitive contents, on the other hand, are considered to be in a one-to-one relationship to the particular aspects of the linguistic system from which they are inferred. They constitute therefore the cognitive characteristics of these aspects and form the transition from the linguistic system to the cognitive system. They are considered the manifestations of the themes of the language to which they are assigned.[123]

As already stated in section 5.1. above, themes are inferred from related cognitive contents. In line with the discussion in section 2.1.6.1. above, cognitive contents are considered to be related when they belong to the same cognitive problem area. Thus, substantive similarity is not a necessary condition for the relatedness of cognitive contents.

It is proposed that to each set of related cognitive contents there corresponds a single theme. The related cognitive contents to which a single theme corresponds are interpreted as the variants of that theme.

Two types of theme variants can be distinguished on the basis of the modalities of cognitive content that constitute a theme. These are: on the one hand, theme variants constituted by basic cognitive contents only, on the other hand, theme variants constituted by both basic cognitive contents and ramifications of the cognitive contents.

The first type of theme variants is represented by the case in which the linguistic aspects that constitute the initial linguistic variables do not belong to the same cognitive problem area as the linguistic aspect under investigation. In this case, the ramifications of the cognitive content indicate a connection with one or several additional cognitive problem areas, and consequently with one or several additional themes. An instance is the case of the noun sublcass membership status (mass, aggregate, individual and mixed) in the Follow-up Study. This classification of concrete entities appears to be an additional manifestation of the Papago concept of identity. The ramifications of the cognitive content of the category of nominal number (i.e., potentiality for grouping in a single locus) indicates, therefore, a connection between the cognitive problem of multiplicity and that of identity (see section 3.2.3.3. above).

The second type of theme variants is represented by the case in which the linguistic aspects that constitute the initial linguistic variables belong to the same cognitive problem area as the linguistic aspect under investigation. In this case the ramifications indicate only the cognitive significance of the linguistic relation between two or more linguistic aspects that belong to the same cognitive problem area. ← An instance is the case of the category of humanness in the revised version of the Test Case. It is an additional manifestation of the concept of identity, the underlying concept manifested by the category of person which is under investigation. It is expected that the ramifications of the cognitive content of the category of person that are derived from the category of humanness will therefore not indicate a connection between the cognitive problem of identity and an additional cognitive problem area. They will only indicate the cognitive significance of the lingistic relation between the category of person and the category of humanness.

The connection between two or more cognitive problem areas indicated by the ramifications of the cognitive content of a given aspect of language serves to establish a relation between two or more themes (see section 5.3. below).

The preceding theoretical discussion, together with the results of the analysis conducted so far, provide a basis for speculating about the themes that correspond to the three cognitive problem areas involved in the analysis. The three themes that suggest themselves will now be discussed in turn.

The first cognitive problem area is that of multiplicity. The linguistic aspect dealt with in the analysis is the category of nominal number. The basic cognitive content of that category includes the two cognitive features of collocation and dispersion. It constitutes a theme variant.

The ramifications of the cognitive content of the category of nominal number indicate a connection between the cognitive problem of multiplicity and that of identity. They indicate, therefore, a connection between the two themes that correspond to these two cognitive problem areas.

Additional linguistic aspects belonging to the same cognitive problem area of multiplicity are: the category of pronominal number, the category of adjectival/adverbial number, and four categories of verbal number, namely, actor/acted upon number, agency number, situational number, and action/event number.

A cursory inspection of these categories suggests that the following characteristics are involved in their respective semantic distinctive features and consequently their respective cognitive contents: for the category of pronominal number -- dispersion; for the category of adjectival/adverbial number -- multiplicity of referent; for the category of actor/acted upon number -- multiplicity of actor and/or acted upon; for the category of agency number -- multiplicity of agency; for the category of situational number -- multiplicity of situation in which the action or the event takes place; for category of action/event number -- multiplicity of action or of event (see footnote 46).

If later analysis reveals that to these various manifestations of multiplicity there correspond cognitive contents in which cognitive features similar to those of collocation and dispersion are present, then, the theme for the cognitive problem of multiplicity may be expected to relate to an opposition of compactness versus lack of compactness.

The relation of the linguistic aspects that belong to the cognitive problem of multiplicity, to the corresponding cognitive contents and theme, is shown graphically in *Diagram VII* 9.

The second cognitive problem area is that of individualness. The linguistic aspect dealt with in the analysis is constituted by the nonextreme manifestations of the property of fusion. The basic cognitive content of that category includes the two cognitive features of high lexical gestalt and low lexical gestalt. It constitutes a theme variant.

The ramifications of the cognitive content of the nonextreme manifestations of the property of fusion indicate a connection between the cognitive problem of individualness and another cognitive problem area which cannot yet be specified precisely but which seems to be related to usage (see section 3.2.4.1.2. above).

An additional linguistic aspect that belong to the same cognitive problem area is constituted by the extreme manifestations of the property of fusion.

A cursory inspection of this linguistic aspect suggests that a situation similar to that found in the non extreme manifestations prevails. If this is so, then the theme for the cognitive problem of individualness may be expected to relate to an opposition of one-of-a-kind-hood versus several-of-a-kindhood.[124]

The relation of the linguistic aspects that belong to the cognitive problem of individualness to the corresponding cognitive contents and theme, is shown graphically in Diagram VI~~II~~.

The third cognitive problem area is that of identity. The linguistic aspect dealt with in the analysis is the category of person. The basic cognitive content of that category includes the cognitive feature of ego endowment. It constitutes a theme variant.

The ramifications of the cognitive content of the category of person have not been ascertained. It is likely, however, that the ramifications derived from the category of pronominal number and the cryptotype of animateness would indicate a connection between the cognitive problem of identity and that of multiplicity, and, therefore, between the two themes that correspond to these two cognitive problem areas.

Additional linguistic aspects that belong to the same cognitive problem area are: mutually exclusive folk taxonomic classes such as those of human beings (*hemajkam*) and things (*haʔicu*), the category of humanness, the cryptotype of animateness, the noun subclass membership statuses of mass, aggregate, individual and mixed, finally, the noun subclass membership statuses of possessible and non possessible.

A cursory inspection of these categories suggests that the following characteristics are involved in their respective semantic distinctive features and, consequently, in their respective cognitive contents: for the mutually exclusive folk taxonomic classes — categorial characteristics of concrete entities; for the category of humanness -- essential characteristics of man; for the cryptotype of animateness -- essential characteristics of living things; for mass, aggregate, individual and mixed statuses -- perceptual characteristics of concrete entities (see section 3.2.1.3.1.2. above); for possessible and non possessible statuses -- relation of concrete entities to each other (see footnote 90).

If later analysis reveals that to these various manifestations of identity there correspond cognitive contents in which cognitive features similar to that of ego endowment are present, then, the theme for the cognitive problem of identity may be expected to relate to an opposition of self-awareness versus lack of self-awareness.

The relation of the linguistic aspects that belong to the cognitive problem of identity, to the corresponding cognitive contents and theme, is shown graphically in Diagram IX.

In summary: Speculation based on the results of the analysis conducted in the course of the present research has suggested three themes of the Papago language. Two of these themes appear to be peculiar to the Papago language-and-culture situational context. They are: the compactness--lack of compactness theme and the self-awareness -- lack of self awareness theme.[125] One of the themes, on the other hand, appears to be universal. This is the one-of-a-kind~~hood~~ several-of-a-kind hood theme. In addition, the two themes peculiar to Papago language-and-culture situational context appears to be related.

The preceding discussion allows one to specify further the distinction between three fundamental notions in the present approach, namely, underlying concept, cognitive content and theme.

The notion of underlying concept is distinguished from both that of cognitive content and that of theme as follows: A given underlying concept is the universal concept that is assumed to have manifestations in a given linguistic system.

A given cognitive content and a given theme, on the other hand, are the manifestations of a given underlying concept in a given language-and- culture situational contexts that can be inferred from the linguistic system.

The notion of cognitive content is distinguished from that of theme as follows: A given cognitive content is the theme variant that is inferred from a given linguistic aspect. A given theme, on the other hand, is the generalization that is abstracted from related cognitive contents, i.e., from given theme variants.

5.3. From themes to theme structure

As stated in section 5. above, the theme structure is constituted by the themes and the relations, both paradigmatic and syntagmatic, into which they enter. These two types of relation will now be discussed in turn.

5.3.1. Paradigmatic relations: theme classes

Paradigmatic relations (i.e. relations of class inclusion) are ascertained on the basis of shared characteristics in terms of which classes are defined. Two types of theme classes suggest themselves so far: on the one hand, classes of one constituted by isolated themes, i.e., themes that are unrelated to any other theme of the language; on the other hand, classes of connected themes, i.e., themes that are related to other themes of the language. The relation of two or more themes is shown by the ramifications of the cognitive content of the linguistic aspects that belong to the cognitive problem areas to which these themes correspond. One such theme class includes the compactness - lack of compactness theme and the self-awareness - lack-of-self awareness theme discussed in section 5.2. above. It is proposed that the characteristics shared by the themes of the same class constitute the configuration of that class.

Thus, the characteristics shared by the two themes mentioned above constitute a theme configuration. The latter, however, remains to be ascertained.

5.3.2. Syntagmatic relations: distributional patterns of themes

Syntagmatic relations (i.e. relations of arrangement) involve both relations of cooccurrence and relations of mutual exclusion. They are ascertained in terms of a suitable distribution frame. In the case of the themes of the language this involves the study of the sequential distribution of themes in specified types of discourse, such as myth. For each type of discourse, however, it remains to be ascertained what would be a suitable frame in order to ascertain the distributional patterns of the themes of the language.

6. Conclusion

In conclusion, an attempt will be made to evaluate both the approach followed, and the results obtained, in the course of this study.

6.1. Evaluation of proposed approach

The approach proposed for the cognitive analysis of language that was presented in this monograph stresses the importance of operationally defined conceptual tools and of the rigorous adherence to an established sequence of analytic steps. It is based on a chain of inferences that leads from underlying concepts to theme structure. This chain of inferences includes the following links: from underlying concepts to semantic distinctive features, to cognitive contents, to themes, to theme structure. These links in the chain of inferences correspond to the different levels of abstraction in the cognitive study of language.

Both the conceptual tools and the step sequence that are part of the present approach had to be gradually refined in the course of the research. Each time a refinement was introduced, it consisted in a further specification of relevant distinctions rather than in a revision of the basic nature of either the conceptual tools or the analytic steps.

The specification of distinctions relevant to given conceptual tools permitted one to render more explicit the bearing of those conceptual tools on the cognitive analysis of language.

Thus, the bearing of the notion of cognitive content as distinct from that of semantic distinctive features -- on the cognitive analysis of language is that it provides the basic information from which the themes of the language are inferred. The bearing of the distinction between the two modalities of cognitive content on the cognitive analysis of language~~, on the other hand,~~ is that it ultimately allows one to ascertain the relatedness of two or more themes.

The specification of distinctions relevant to given conceptual tools also permitted the formulation in more precise terms of the tasks that pertain to each analytic step.

Thus, the specification of the various facets of a cognitive problem area permitted the precise formulation of the four tasks that pertain to step 1 of the step sequence.

The refinements introduced in both the conceptual tools and the step sequence have been discussed in sections 2.3.2 and sections 4.1. above.

As a result of these refinements, the proposed approach to the cognitive study of language has achieved a certain degree of generality. In order to insure its complete generality it should be applied to additional cognitive problem areas of a very different nature. This question has been discussed in section 2.3.3.1. above.

6.2. Evaluation of results

In the course of the present research, the approach proposed for the cognitive analysis of language has yielded three types of results: (1) analytically derived contents; (2) suggested themes; (3) a suggestion regarding the relations that make up the theme structure.

The reliability of these results can be judged in terms of two criteria: (1) a criterion of logical reliability, i.e., reliability based on the consistent application of the proposed approach; (2) a criterion of tested reliability, i.e., reliability based on verification by empirical testing.

Logical reliability was attempted by rendering explicit the details of the approach itself as well as of the reasoning underlying every analytic decision. Tested reliability was not attempted.[126]

The results obtained in the course of the research will therefore be judged only in terms of logical reliability. They will now be discussed in turn.

The first type of results concerns the inferred cognitive contents. Although neither one of the three individual studies is actually complete,[127] it is proposed that the cognitive contents that have resulted from the analysis meet the criterion of logical reliability without restriction.

The second type of results concerns the suggested themes. As was already pointed out, at this stage of the research, themes could be suggested only by speculating on the basis of both the theoretical frame of reference and the results obtained in the analysis (see section 5.2. above).

It is proposed that the suggested themes meet the criterion of logical reliability with the following qualification: they are hypothetical results.

The third type of results concerns the suggestions regarding the relations that constitute the theme structure, namely the two types of theme classes, the theme confugurations and the distribution of patterns of themes in specified types of discourse.

It is proposed that these suggestions meet the criterion of logical reliability with the following qualification: they are anticipated results.

Thus the three types of results meet the criterion of logical reliability to a different degree.

ILLUSTRATIONS

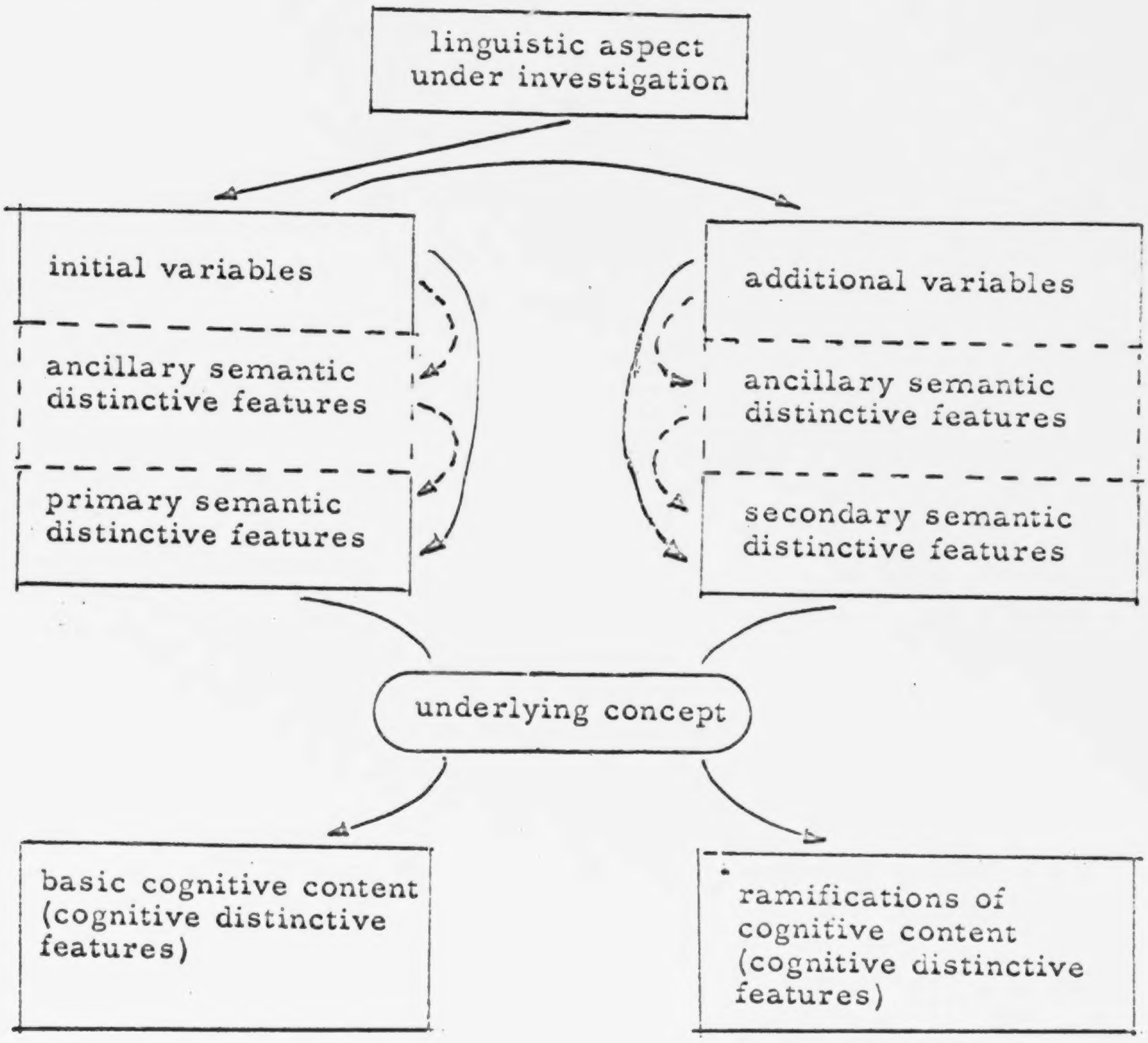
linguistic aspect under investigation
initial variables
ancillary semantic distinctive features
primary semantic distinctive features
additional variables
ancillary semantic distinctive features
secondary semantic distinctive features
underlying concept
basic cognitive content (cognitive distinctive features)
ramifications of cognitive content (cognitive distinctive features)

Diagram I . General schema for cognitive analysis

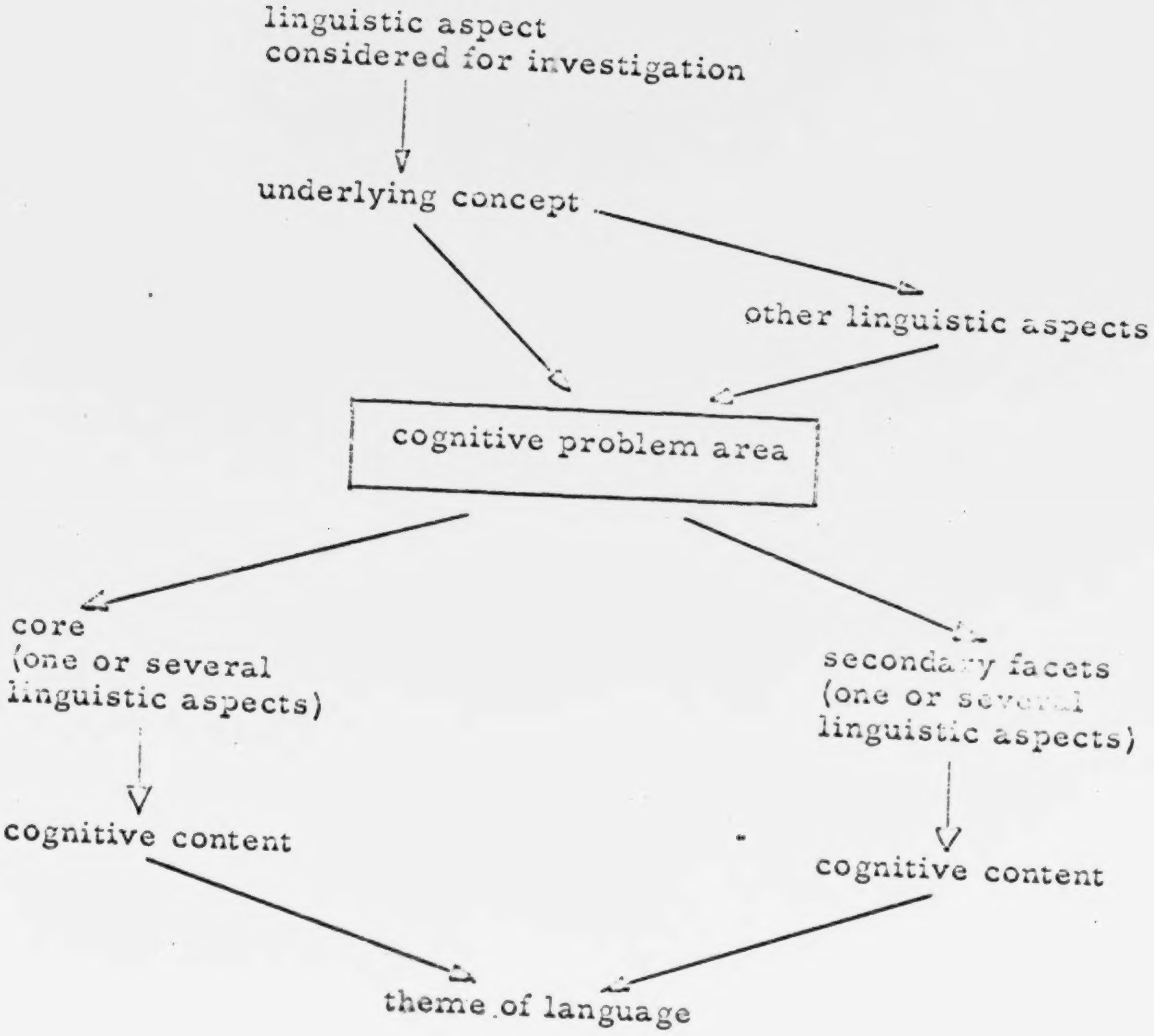
linguistic aspect considered for investigation
underlying concept
other linguistic aspects
cognitive problem area
core (one or several linguistic aspects)
secondary facets (one or several linguistic aspects)
cognitive content
cognitive content
theme of language

Diagram II. Relation of cognitive problem area to the linguistic aspects included in it

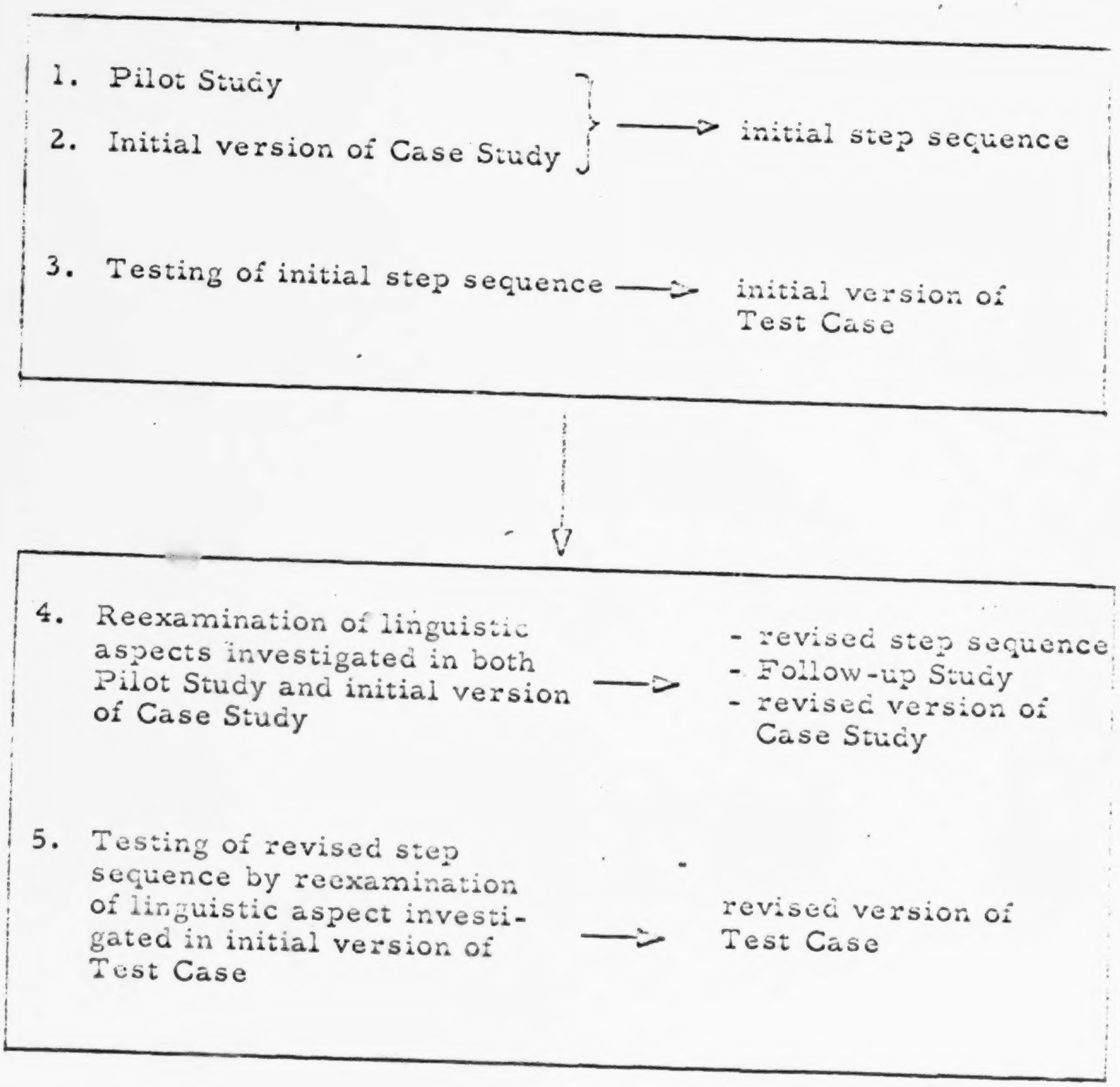
1. Pilot Study
2. Initial version of Case Study
initial step sequence
3. Testing of initial step sequence
initial version of Test Case
4. Reexamination of linguistic aspects investigated in both Pilot Study and initial version of Case Study
- revised step sequence
- Follow-up Study
- revised version of Case Study
5. Testing of revised step sequence by reexamination of linguistic aspect investigated in initial version of Test Case
revised version of Test Case

Diagram III. Relation of step sequence to individual investigations

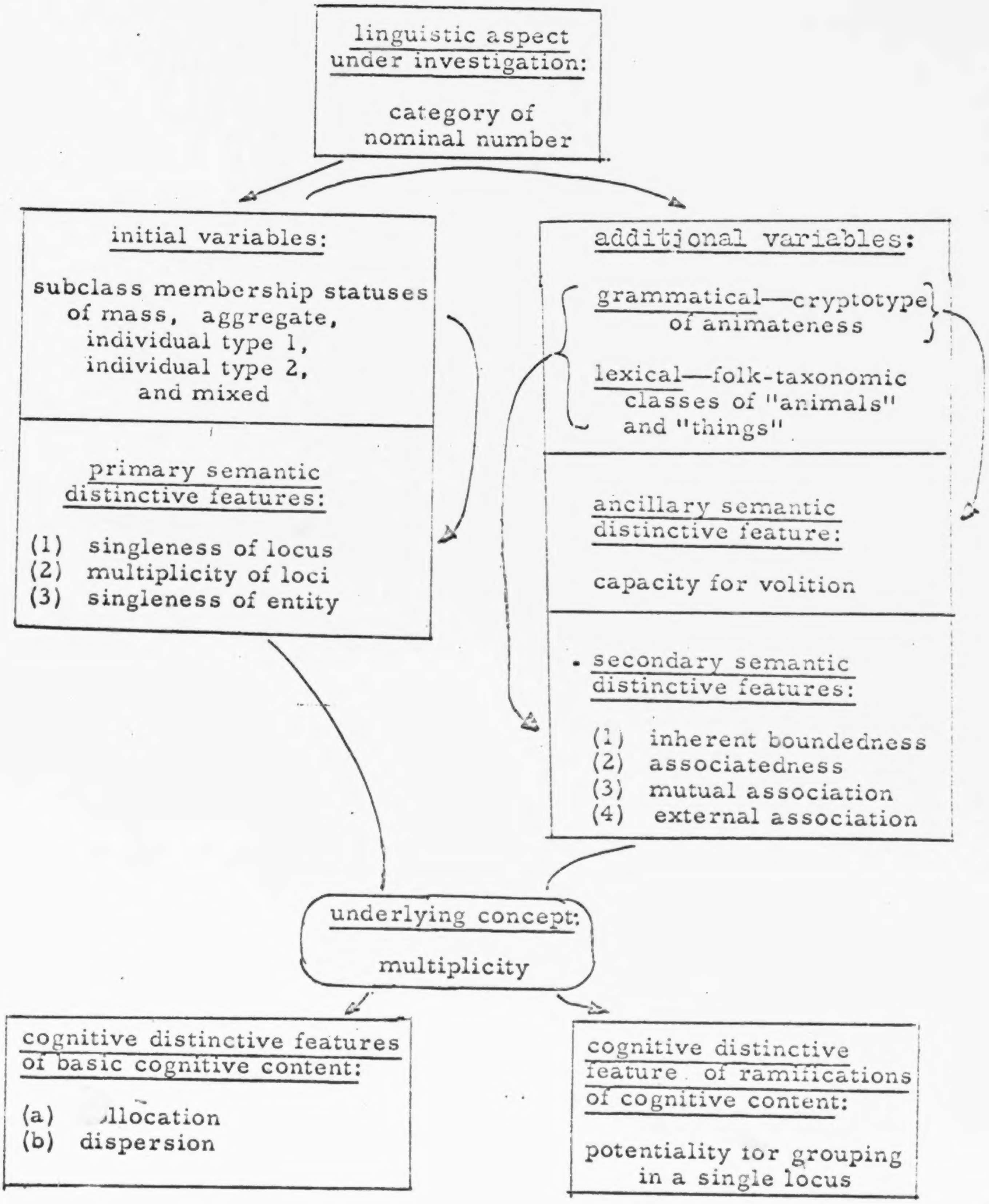
linguistic aspect under investigation:
category of nominal number
initial variables:
subclass membership statuses of mass, aggregate, individual type 1, individual type 2, and mixed
primary semantic distinctive features:
(1) singleness of locus
(2) multiplicity of loci
(3) singleness of entity
additional variables:
grammatical—cryptotype of animateness
lexical—folk-taxonomic classes of "animals" and "things"
ancillary semantic distinctive feature:
capacity for volition
secondary semantic distinctive features:
(1) inherent boundedness
(2) associatedness
(3) mutual association
(4) external association
underlying concept:
multiplicity
cognitive distinctive features of basic cognitive content:
(a) collocation
(b) dispersion
cognitive distinctive feature of ramifications of cognitive content:
potentiality for grouping in a single locus

Diagram IV. Schema of cognitive analysis applied to the category of nominal number in Papago

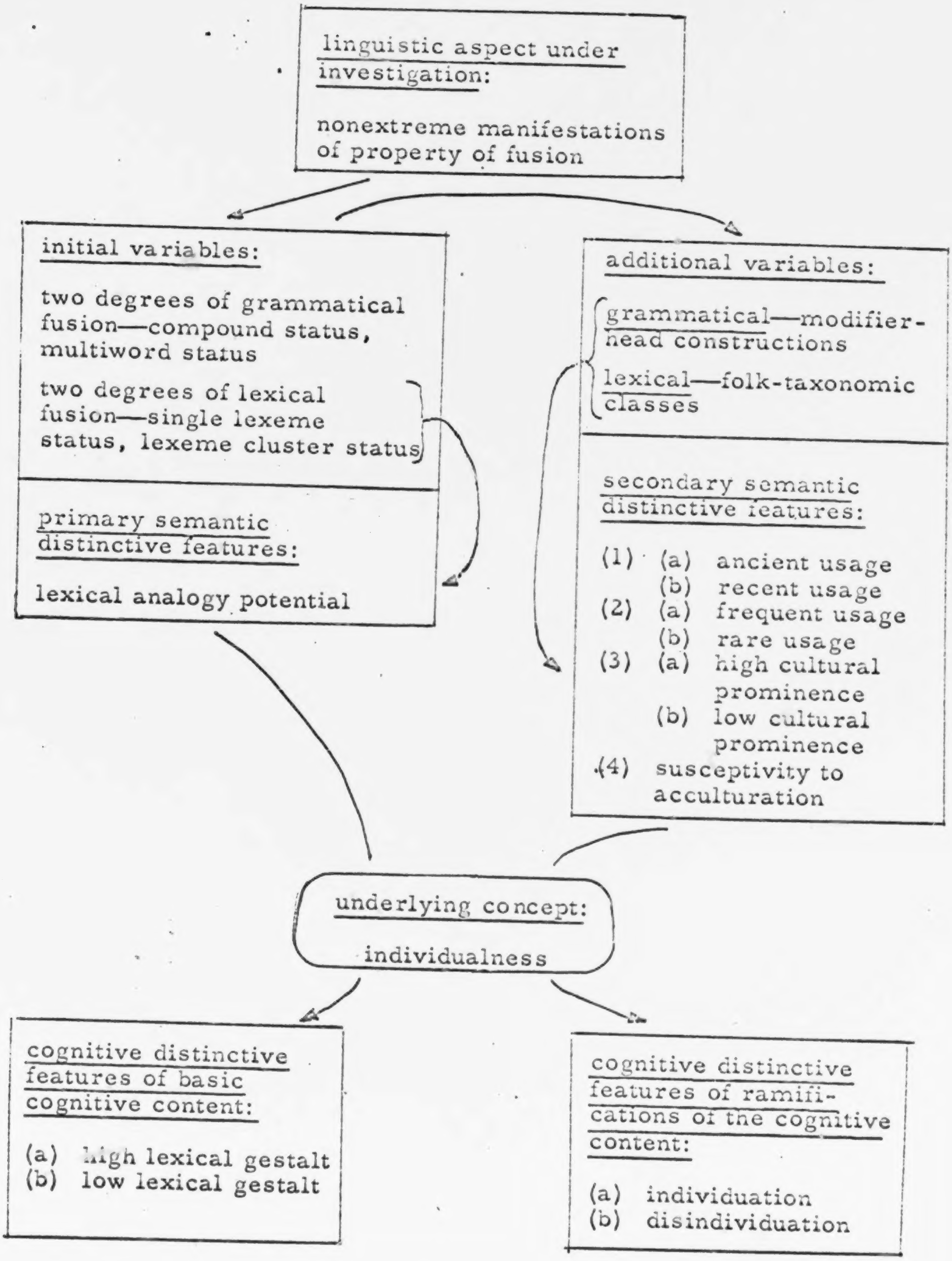
linguistic aspect under investigation:
nonextreme manifestations of property of fusion
initial variables:
two degrees of grammatical fusion—compound status, multiword status
two degrees of lexical fusion—single lexeme status, lexeme cluster status
primary semantic distinctive features:
lexical analogy potential
additional variables:
grammatical—modifier-head constructions
lexical—folk-taxonomic classes
secondary semantic distinctive features:
(1) (a) ancient usage
(b) recent usage
(2) (a) frequent usage
(b) rare usage
(3) (a) high cultural prominence
(b) low cultural prominence
(4) susceptivity to acculturation
underlying concept:
individualness
cognitive distinctive features of basic cognitive content:
(a) high lexical gestalt
(b) low lexical gestalt
cognitive distinctive features of ramifications of the cognitive content:
(a) individuation
(b) disindividuation

Diagram V. Schema of cognitive analysis applied to nonextreme manifestations of property of fusion in Papago

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facet of cognitive problem area		linguistic aspect	cognitive content	theme
core		category of nominal number [sg: pl: distr]	collocation dispersion	compactness—lack of compactness (?)
secondary facets		category of pronominal number [disperse: nondisperse]	dispersion (?)	
		category of adjectival/adverbial number [single referent: multiple referent]	multiplicity of referent (?)	
	categories of verbal number	actor/acted upon number [sgs: pls ; sgo: plo]	multiplicity of actor and of acted upon (?)	
		agency number [single agency: multiple agency]	multiplicity of agency (?)	
		situational number [unitive: repetitive: distributive]	multiplicity of situations for actions and/or events (?)	
		action/event number [semelfactive or unmarked versus recursive and/or reiterative]	multiplicity of action and/or event	

Diagram VII. Cognitive problem of multiplicity

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facet of cognitive problem area	linguistic aspect	cognitive content	theme
core	nonextreme manifestations of property of fusion	high lexical gestalt low lexical gestalt	one-of-a-kindhood several-of-a-kindhood (?)
	extreme manifestations of property of fusion	high lexical gestalt (?) low lexical gestalt (?)	

Diagram VIII. Cognitive problem of individualness

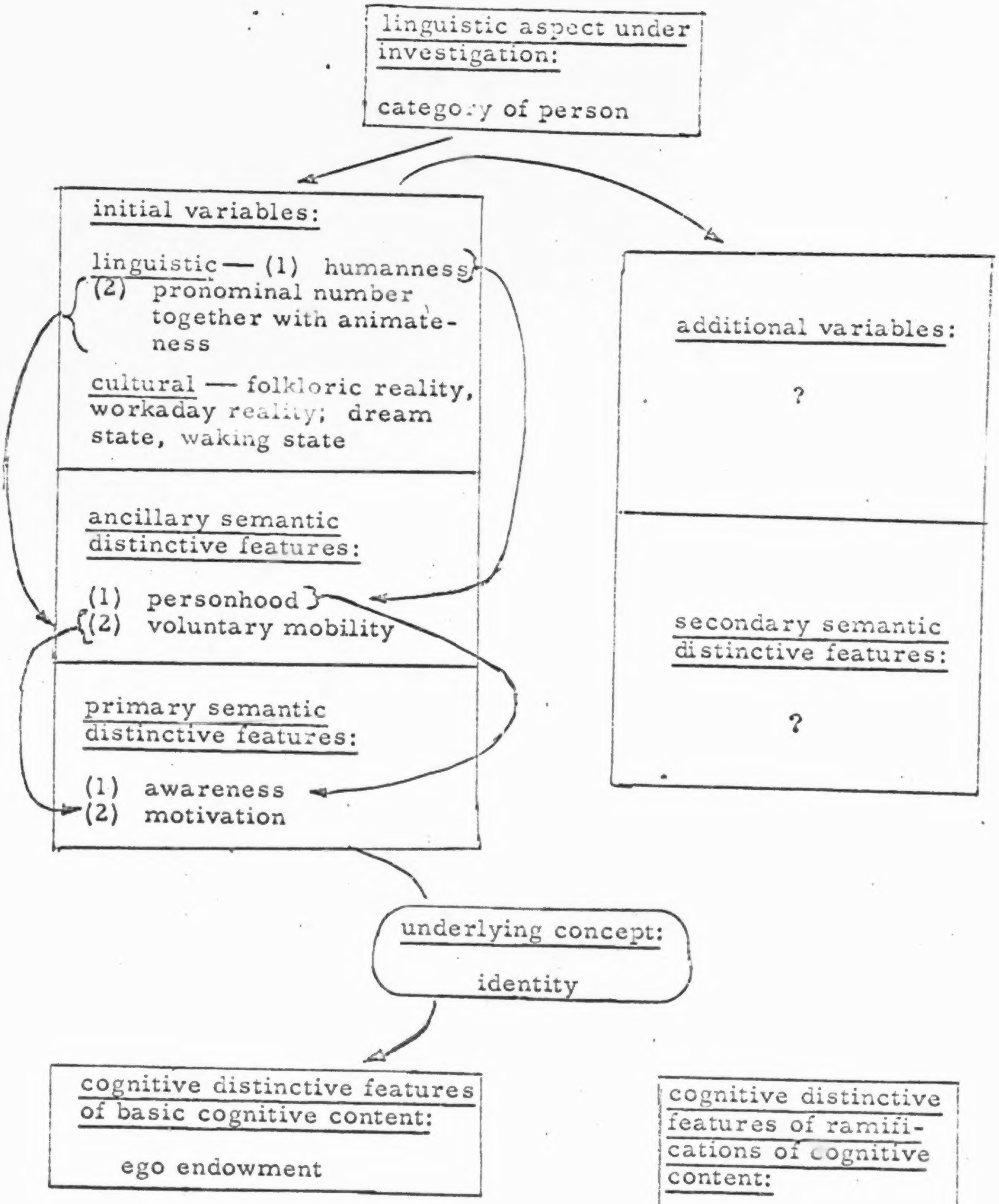
linguistic aspect under investigation:
category of person
initial variables:
linguistic — (1) humanness
(2) pronominal number together with animateness
cultural — folkloric reality, workaday reality; dream state, waking state
ancillary semantic distinctive features:
(1) personhood
(2) voluntary mobility
primary semantic distinctive features:
(1) awareness
(2) motivation
additional variables:
?
secondary semantic distinctive features:
?
underlying concept:
identity
cognitive distinctive features of basic cognitive content:
ego endowment
cognitive distinctive features of ramifications of cognitive content:
?

Diagram VIII Schema of cognitive analysis applied to category of person in Papago

facet of cognitive problem area	linguistic aspect	cognitive content	theme
core	category of person [1st: 2nd: 3rd]	ego endowment	selfawareness—lack of selfawareness (?)
	mutually exclusive folk-taxonomic classes [hemajkam: haʔicu]	categorial characteristic of concrete entities (?)	
secondary facets	category of humanness [human: nonhuman]	essential characteristics of concrete entities (?)	
	cryptotype of animateness [animate: inanimate]	essential characteristics of living things (?)	
	noun sublcass membership statuses of mass: aggregate: individual 1: individual 2: mixed	perceptual characteristics of concrete entities (?)	
	noun subclass membership statuses of possessible: nonpossessible	relation of concrete entities to each other (?)	

Diagram IX. Cognitive problem of identity

Step		Pilot Study	Initial Version of Case Study
Phase I: Specification	1 specification of problem area	relation of grammatical category of number to concept of multiplicity	relation of grammatical and lexical fusion to concept of terminological unity
	2 specification of pertinent data	among naming units refering to concrete entities, random sampling of those which (a) ' refer to "quantifiable" entities, and (b) have identical grammatical internal structure: one noun each	among naming units refering to concrete entities, random sampling of those which (a) are multibase units, and (b) have diversified grammatical and lexical internal structure
	3 specification of initial variables	external functioning of chosen naming units allows subclassification of the nouns of which they consist as follows: mass nouns, aggregate nouns, individual nouns, and mixed nouns	internal structure of chosen naming units allows their subclassification as follows: (1) grammatically, single words (compounds) and multiword units; (2) lexically, lexemes and lexeme clusters

Table I. Initial step sequence applied to linguistic aspects of Pilot Study and Case Study

	Step		Pilot Study	Initial Version of Case Study
Phase II: Analysis	4 observation: inspection of inventories of initial sets		inspection of mass nouns suggests inferences relevant to concept of multiplicity; no result for remaining nouns	no result
	5 manipulation: search for additional appropriate sets	first part: formation of additional grammatical sets and inspection of their inventories	no additional sets	inspection of types of modifier-head constructions suggests inferences relevant to concept of terminological unity
		second part: formation of additional lexical sets and inspection of their inventories	inspection of folk-taxonomic classes suggests inferences relevant to concept of multiplicity	inspection of folk-taxonomic classes corroborates previous inferences and suggests additional inferences relevant to concept of terminological unity

Table I. Initial step sequence applied to linguistic aspects of Pilot Study and Case Study (cont'd)

Phase		Step	Follow -up Study	Revised Version of Case Study
Phase I: Specification	1	Formulation of cognitive problem area	core: relation of category of nominal number to concept of multiplicity	core: relation of nonextreme manifestations of fusion to concept of individualness
	2	Specification of pertinent data	retained unchanged from application of initial step sequence to Pilot Study and initial version of Case Study (see Table I)	
Phase II: Analysis	3 uncovering of basic cognitive content	identification of initial variables	linguistic: subclass membership statuses of mass, aggregate, individual 1, individual 2, mixed. (cultural: subgroup affiliation)	linguistic: compound status and multiword status; single-lexeme status and lexeme cluster status. (cultural: subgroup affiliation)
		inference of primary semantic distinctive features (directly or through ancillary semantic distinctive features)	(1) singleness of locus (2) multiplicity of loci (3) singleness of entity	lexical analogy potential
		inference of cognitive distinctive features of basic cognitive content	1. (a) collocation (b) dispersion	1. (a) high lexical gestalt (b) low lexical gestalt

Table II. Revised step sequence applied to linguistic aspects of Follow-up Study and Case Study

			Step	Follow-up Study	Revised Version of Case Study
Phase II: Analysis	4 uncovering the ramifications of the cognitive content	first part	identification of additional grammatical variables	cryptotype of animateness	modifier-head constructions
			inference of grammatically derived secondary semantic distinctive features (directly or through ancillary semantic distinctive features)	inherent boundedness	1. a. ancient usage b. recent usage 2. a. frequent usage b. rare usage 3. a. high cultural prominence b. low cultural prominence
			inference of cognitive distinctive features of ramifications of cognitive content	potentiality for grouping in a single locus	1. a. individuation b. disindividuation
		second part	identification of additional lexical variables	folk-taxonomic classes of animals and things	folk-taxonomic classes
			inference of lexically-derived secondary semantic distinctive features (directly or through ancillary semantic distinctive features)	(1) associatedness (2) mutual association (3) external association	1. a. ancient usage b. recent usage 2. a. frequent usage b. rare usage 3. a. high cultural prominence b. low cultural prominence 4. susceptivity to acculturation
			inference of cognitive distinctive features of ramifications of cognitive content	potentiality for grouping in a single locus	1. a. individuation b. disindividuation

Table II. Revised step sequence applied to linguistic aspects of Follow-up Study and Case Study (cont'd)

Step		Application to Text Case
Phase I: Specification	1 specification of problem area	relation of grammatical category of person to Papago concept of identity
	2 specification of pertinent data	among naming units referring to concrete entities, random sampling of those which can (a) co-occur with the carriers of the category of person, and (b) replace the carriers of the category of person
	3 specification of initial variables	the semantic features of the personal pronouns entering into opposition 2 (human versus non-human), opposition 3 (verbally active versus verbally inactive), and opposition 4 (confined versus extended)

Table III. Initial step sequence applied to the linguistic aspect of the Test Case

Step			Application to Test Case
Phase II: Analysis	4 observation: inspection of inventories of initial sets		inspection of naming units corresponding to opposition 2 and opposition 3 suggests pertinence of 4 cultural contexts: dream and waking state of folkloric and workaday reality; no result for opposition 4
	5 manipulation: search for additional appropriate sets	first part: formation of additional grammatical sets and inspection of their inventories	no additional sets for naming units corresponding to opposition 2 and opposition 3; inspection of sets of naming units corresponding to opposition 4, further subdivided into animate versus inanimate, suggests inferences relevant to concept of identity
		second part: formation of additional lexical sets and inspection of their inventories	inspection of folk-taxonomic classes of naming units corresponding to opposition 2 and opposition 3, further subdivided into classes corresponding to broad and narrow cultural conditions, suggests additional inferences relevant to concept of identity; inspection of folk-taxonomic classes of animate and inanimate naming units corresponding to opposition 4, further subdivided into classes corresponding to folkloric and workaday reality (if this cultural variable applies) should suggest additional inferences relevant to concept of identity

Table III. Initial step sequence applied to the linguistic aspect of the Test Case (cont'd)

	Step		Revised Version of Text Case
Phase I: Specification	1	Formulation of cognitive problem area	part of the core: relation of category of person to concept of identity
	2	Specification of pertinent data	among naming units referring to concrete entities, random sampling of those which can (a) co-occur with the carriers of the category of person and (b) replace the carriers of the category of person
Phase II: Analysis	3 Uncovering the basic cognitive content	identification of initial variables	linguistic: - category of humanness - category of pronominal number together with animateness cultural: folkloric reality and workaday reality; dream state and waking state
		inference of primary semantic distinctive features (directly or through ancillary semantic distinctive features)	(1) awareness (2) motivation
		inference of cognitive distinctive features of basic cognitive content	ego endowment

Table IV. Revised step sequence applied to linguistic aspect of Test Case

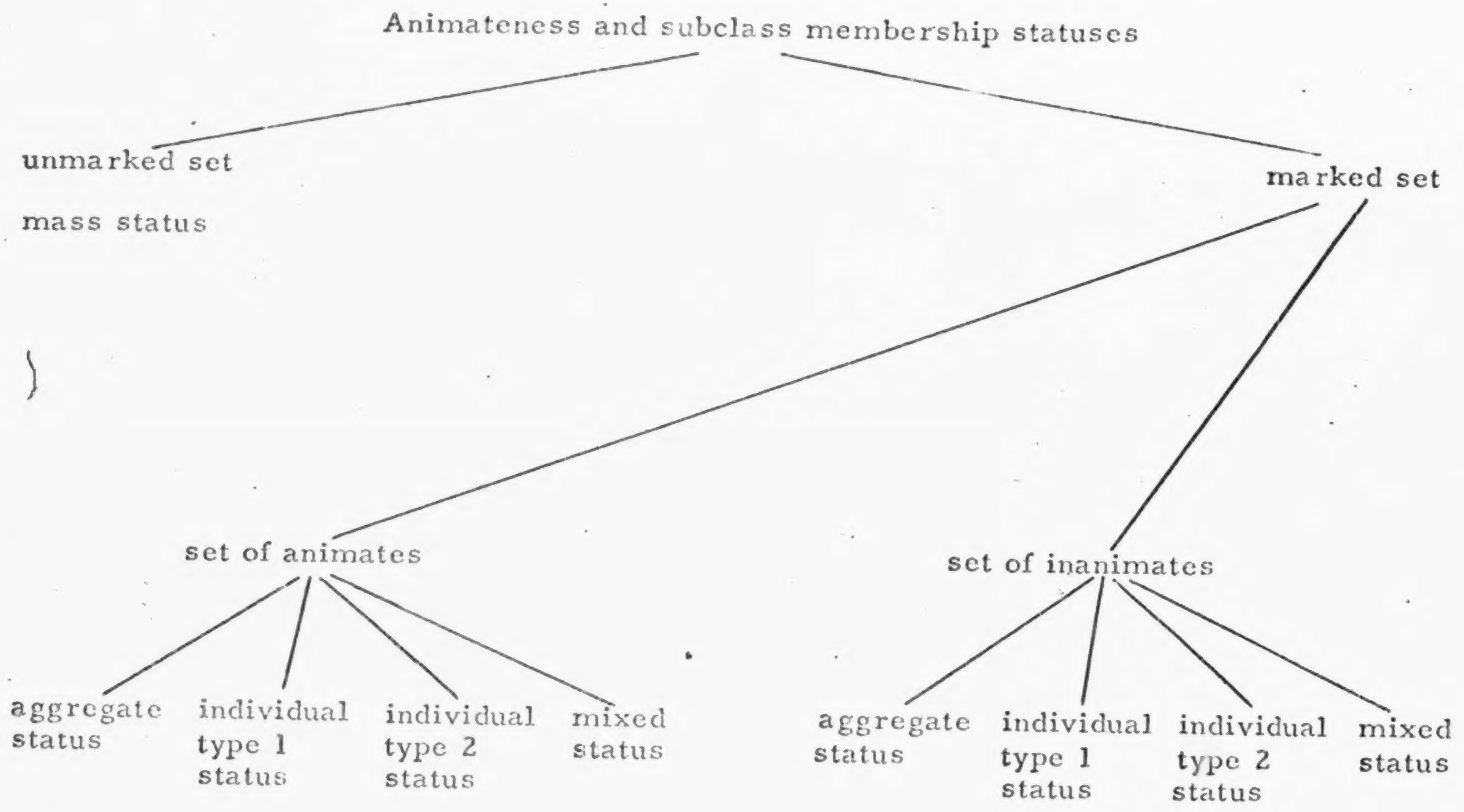
Animateness and subclass membership statuses
unmarked set
mass status
marked set
set of animates
set of inanimates
aggregate status
individual type 1 status
individual type 2 status
mixed status
aggregate status
individual type 1 status
individual type 2 status
mixed status

Figure 1. Relation of cryptotype of animateness to noun subclass membership statuses

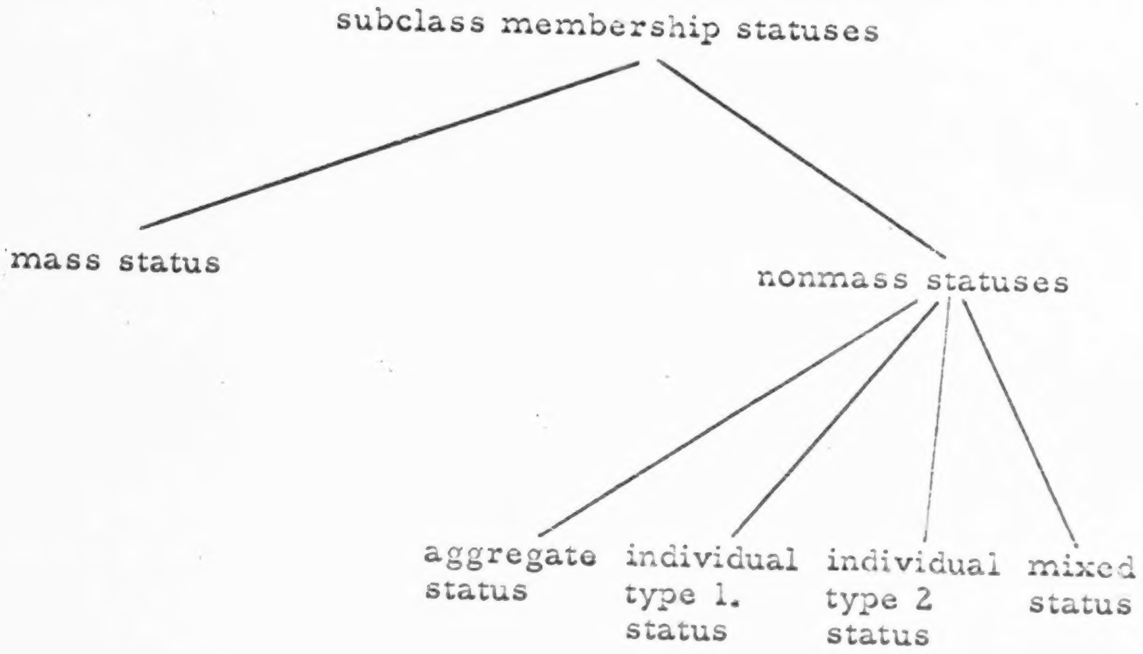
subclass membership statuses
mass status
nonmass statuses
aggregate status
individual type 1. status
individual type 2 status
mixed status

Figure 2. Relation of subclass membership statuses to each other

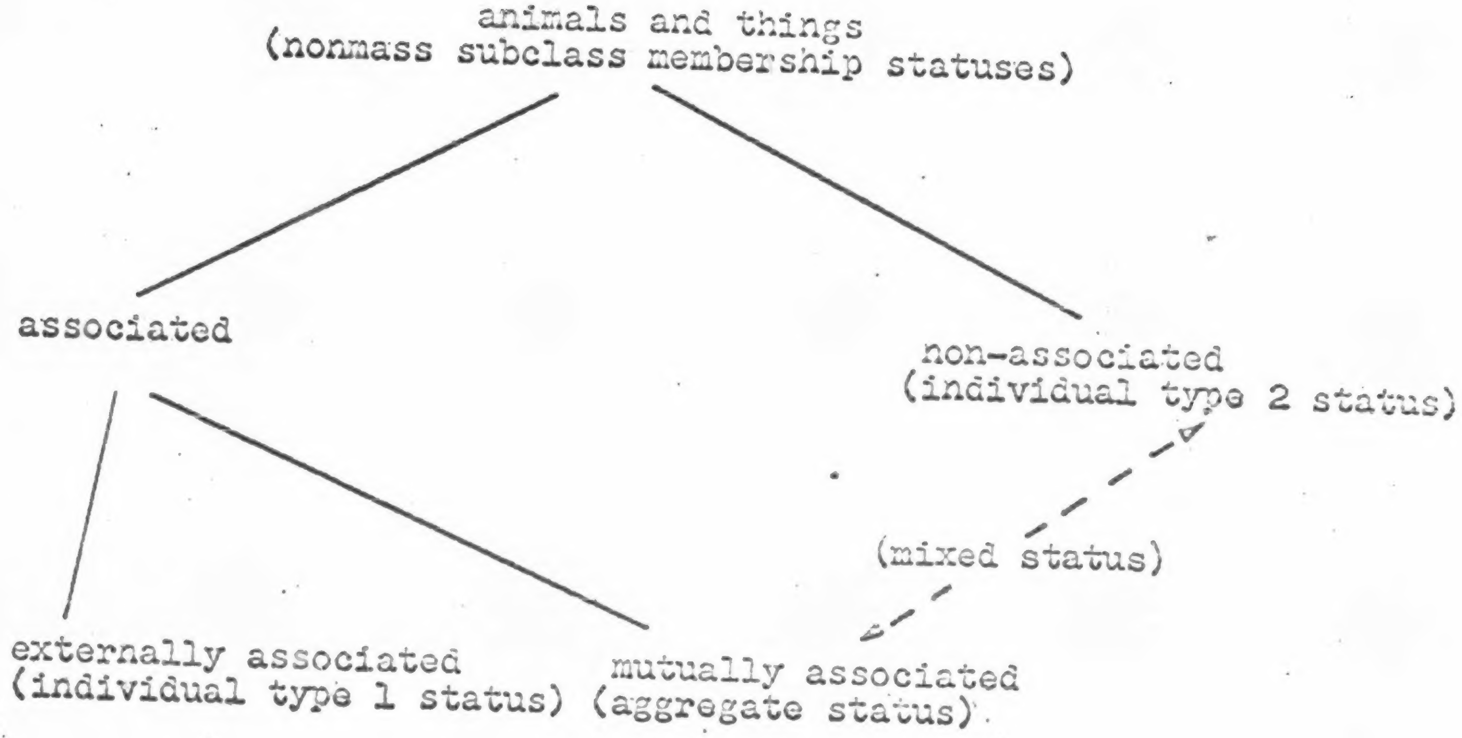
animals and things
(nonmass subclass membership statuses)
associated
non-associated
(individual type 2 status)
(mixed status)
externally associated
(individual type 1 status)
mutually associated
(aggregate status)

Figure 3. Relation of the subclass membership statuses to the secondary semantic distinctive features

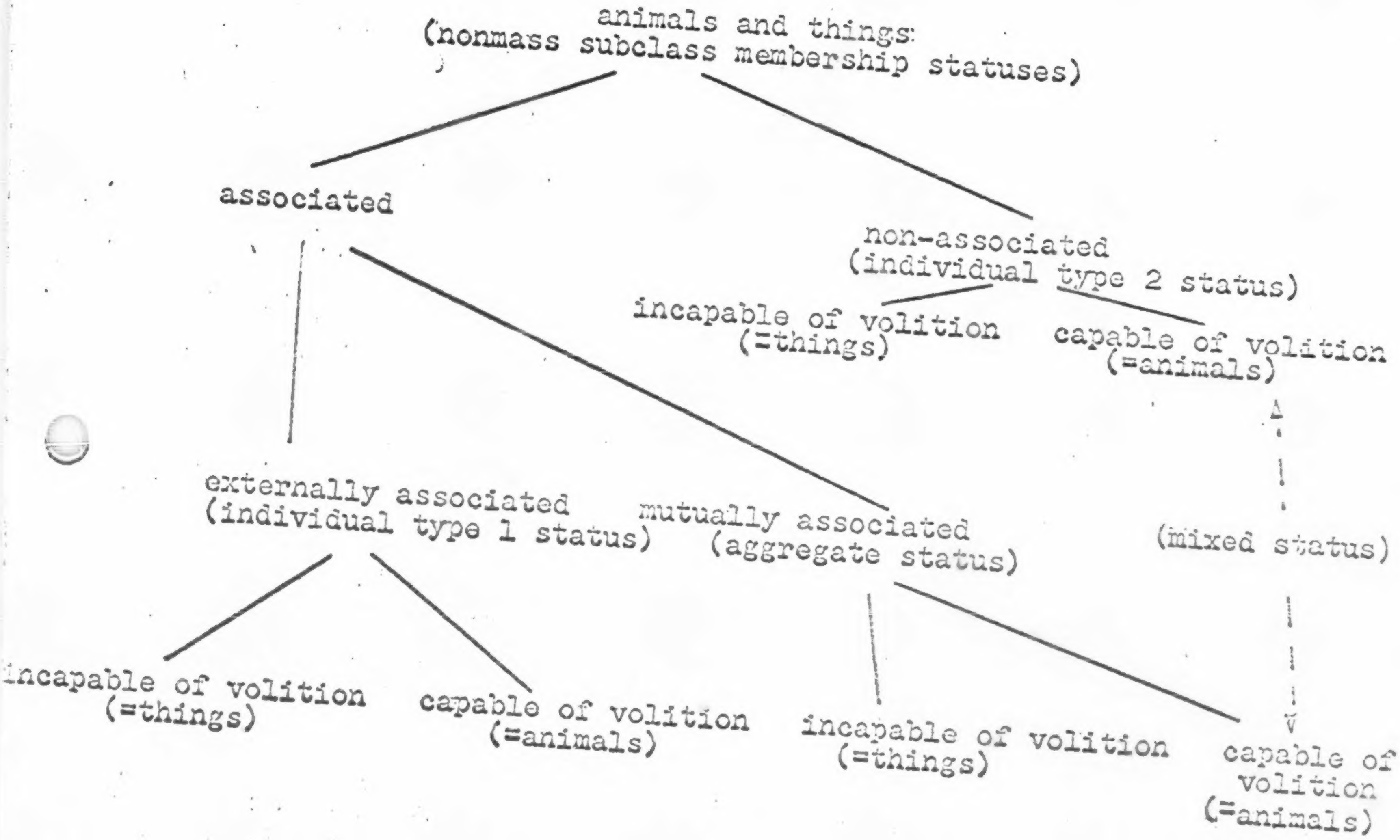
animals and things
(nonmass subclass membership statuses)
associated
non-associated
(individual type 2 status)
incapable of volition
(=things)
capable of volition
(=animals)
externally associated
(individual type 1 status)
mutually associated
(aggregate status)
(mixed status)
incapable of volition
(=things)
capable of volition
(=animals)
incapable of volition
(=things)
capable of volition
(=animals)

Figure 4. Relation of the subclass membership statuses to the ancillary semantic distinctive feature and the secondary semantic distinctive features

Degrees of collocation			Degree of dispersion
total collocation	first-degree partial collocation	second-degree partial collocation	total dispersion
singular	non-distributive	plural	distributive nonsingular
mass			mass
	aggregate		aggregate
individual 1		individual 1	individual 1
individual 2			individual 2
mixed	mixed		mixed
single locus			several loci

Figure 5. Position of class membership statuses on collocation-dispersion scale

factors	corresponding semantic distinctive features
1. relative oldness of usage	a) ancient usage b) recent usage
2. relative frequency of usage	a) frequent usage b) rare usage
3. relative cultural prominence	a) high cultural prominence b) low cultural prominence
4. acculturation	susceptibility to accumulation

Figure 6. Factors relevant to the manifestations of the property of fusion with the semantic distinctive features corresponding to them

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Pronominal number		Person	Indefiniteness
nondispersed	?añ "I"	1st	
dispersed	?ac "we"	1st	
nondispersed	?ap "you [sg.]"	2nd	
dispersed	?am "you [pl.]"	2nd	
	?o "he, she, it, they"	3rd	nonindefinite
	?am "one, ones"	3rd	indefinite

Figure 7 A. Subject pronouns

Pronominal number	Form	Person	Humanness	Specification	Objecthood	Indefiniteness	Reflexivity
nondispersed	ñ- "(of) me"	1st					nonreflexive
dispersed	t- "(of) us"	1st					nonreflexive
nondispersed	m- "(of) you [sg.]"	2nd					nonreflexive
dispersed	ʔem- "(of) you [pl.]"	2nd					nonreflexive
nondispersed	∅*, g-, -j "(of) him, her, it; (of) them [inanimate]"	3rd				nonindefinite	nonreflexive
dispersed	ha(-) "(of) them"	3rd				nonindefinite	nonreflexive
	ha(-) "(of) one, ones"	3rd	human		direct object	indefinite	nonreflexive
	(-)cu "one, ones"	3rd	nonhuman		direct object	indefinite	nonreflexive
	ʔem- "by animate entity, entities"	3rd		precise	agent object	indefinite	nonreflexive
	ʔe(-) "by entity, entities"	3rd		vague	agent object	indefinite	nonreflexive
	ʔe- "(of) self, each other"	2nd and/or 3rd					reflexive

* zero morph

Figure 7 B. Object pronouns

Pronominal number		Person				Indefiniteness
nondispersed	?aañi?i	1st				
dispersed	?aacim	1st				
nondispersed	?aapi?i	2nd				
dispersed	?aapim	2nd				
nondispersed	?iida?a, ?id "this, those (inanimate)"	3rd	proximal		location	nonindefinite
dispersed	idam	3rd				
nondispersed	hega?i, heg "that, those (inanimate)"	3rd	distal			
dispersed	hegam					
nondispersed	heḍa?i, -ḍ-	3rd	precise	human	Humanness and Specification	indefinite
dispersed	heḍam	3rd				
nondispersed	hema	3rd	vague			
dispersed	ha?i	3rd				
	ha?icu	3rd	precise	nonhuman		
	hascu	3rd	vague			

Figure 7 C. Emphatic pronouns

Category Type	Category	Members
type 1	syntactic role	emphatic role subject role object role
type 2	person	first second third
	pronominal number	dispersed referent nondispersed referent
	reflexivity	reflexive referent nonreflexive referent
	indefiniteness	indefinite referent nonindefinite referent
	objecthood	agent object direct object
	humanness	human referent nonhuman referent
	specification	precise referent vague referent
	location	proximal referent distal referent

Figure 8. List of the grammatical categories manifested in the personal pronouns

Group	Grammatical Category	Suspected Cognitive Problem Area
I.	syntactic role reflexivity objecthood	agency
II	indefiniteness specificity	reference
III	location	orientation
IV	humanness	identity
V	pronominal number together with animateness	identity

Figure 9. Grammatical categories coalescing with the category of person in the personal pronoun with the cognitive problem areas to which they are suspected to belong

grammatically defined sets		culturally defined sets							
Grammatical reality		Folkloric reality				Workaday reality			
human	nonhuman	Dream state		Waking state		Dream state		Waking state	
		human	nonhuman	human	nonhuman	human	nonhuman	human	nonhuman
heda?i, hedam	ha?icu	hemajkam		hemajkam		hemajkam		hemajkam	
1 A	1 B	2 A	2 B	3 A	3 B	4 A	4 B	5 A	5 B

Figure 10. Sets formed with grammatical category of humanness and associated cultural variables

set 6 personhood is unconditionally present (inherent human status only)		set 7 personhood is conditionally present (inherent nonhuman + ascribed human status)		set 8 personhood is absent (inherent nonhuman status only)			
				A personhood is present by extension		B personhood is totally absent	
people		all animals. some plants (saguaro, corn, jenaxaḍ root, etc.) natural phenomena and objects Sun, Morning Star, Wind, Cloud, Rain parts of human beings scalp of an enemy effigy of a human being		some mountains (e. g., Vuhi-Do?ag, Vav--Givulk, etc.) white feathers images of birds		most plants most natural objects (rocks, water, soil, etc.)	
roles in the speech situation	membership in person category	roles in the speech situation	membership in person category	roles in the speech situation	membership in person category	roles in the speech situation	membership in person category
addresser	1st person	addresser	1st person	addresser	1st person		
addressee	2nd person	addressee	2nd person	addressee	2nd person	addressee	2nd person
referent	3rd person	referent	3rd person	referent	3rd person	referent	3rd person

Figure 11. Relation of the feature of personhood to the category of person.

	medium and addresser	medium and addressee	medium and referent
speaking	ñiok "to speak"	ñiok ?am vui "to talk to someone/something"	ñiok ?ab ?amjeǧ "to talk about someone/something"
singing	ñe?e "to sing [and dance]"	ñe?icud "to sing [and dance] to, for someone/something"	ñe?e ?ab ?amjeǧ "to sing [and dance] about someone/something"
orating	Xuugaj Ñi?okī ?aag "to deliver a Mockingbird Speech"	Xuugaj Ñi?okī ?aagid "to deliver a Mockingbird Speech to, for someone/something"	Xuugaj Ñi?okī ?ab ?amjeǧ "Mockingbird Speech about someone/something"

Figure 12. Folk-taxonomic labels and components (underlined) used in role-determination questions

nondispersed			dispersed		
Personal pronoun	Translation	Meaning variants	Personal pronoun	Translation	Meaning variants
ʔaañiʔi, ʔañ, ñ-	"I, me"	single entity	ʔaacim, ʔac, t-	"we, us"	several entities
ʔaapiʔi, ʔap, m-	"(of) you [sg.]"	single entity	ʔaapim, ʔam, ʔem-	"(of) you [pl.]"	several entities
ø*, g, -j	"(of) him, her, it; them (inanimate)"	single entity; single group of inanimate entities	ha-	"(of) them"	several entities
ʔiidaʔa, ʔid	"this one; this group (inanimate)"	single entity; single group of inanimate entities	ʔidam	"these; these groups"	several entities; several groups of entities
hegaʔi	"that one; that group (inanimate)"	single entity; single group of inanimate entities	hegam	"those; those groups"	several entities; several groups of entities
heḍai, ḍ	"someone(precise)"	single entity	heḍam	"some people (precise)"	several entities
hema	"someone(vague)"	single entity	haʔi	"some people (vague)"	several entities

* zero morph

Figure 13. Personal pronouns/carriers of the category of pronominal number

animate		inanimate	
set 1 nondispersed (∅*, ?iida?a, hega?i)	set 2 dispersed (ha, ?idam, hegam)	set 3 nondispersed (∅*, ?iida?a, hega?i)	set 4 dispersed (ha, ?idam, hegam)
?o?odham (citation form) "man, Papago"	?o?odham (citation form) "men, Papagos in/of a single group" ?o??odham (derived form) "men, Papagos in/of several groups or scattered"	haaxañ (citation form) "saguaro cactus" hahaxañ (derived form) "saguaro cacti in a single group"	hahaxañ (derived form) "several saguaro cacti in several groups or scattered"
haivañ (citation form) "cow"	haivañ (citation form) "cows in/of a single group" hahaivañ (derived form) "cows in/several groups or scattered"	kii (citation form) "house" kiikĩ (derived form) "houses in a single group"	kiikĩ (derived form) "houses in several groups or scattered
ban (citation form) "coyote"	baaban (derived form) "coyotes in/of a single group or in/of several groups or scattered"	daikuḍ (citation form) "chair" dadaikuḍ (derived form 1) "chairs in a single group"	daddaikuḍ (derived form 2) "chairs in several groups or scattered)
?uvĩ (citation form) "woman"	?u?uvĩ (derived form) "women in/of a single group or in/of several groups or scattered"	?uupaḍ (citation form) "catclaw, catclaws in a single group"	?u?upaḍ (derived form) "catclaws in several groups or scattered)

* zero morph

Figure 14. Sets displaying the relation of the category of pronominal number to the cryptotype of animateness

set 5 voluntary mobility is unconditionally present (ʔoimmeḍ—ʔoiopo)		set 6 voluntary mobility is conditionally present		set 7 voluntary mobility is absent	
all animates (e. g., people, animals) and those inanimates that have ascribed human status (e. g., saguaro, corn)		inanimates that are images or parts of animates, e.g., images of birds, feathers, mountains		all inanimates that neither have ascribed human status nor are images of animates	
role in the speech situation	membership in the category of person	role in the sp. situation	membership in categ. of person	role in the sp. situation	membersh. in categ. of person
addresser addressee referent	1st person 2nd person 3rd person	addresser addressee referent	1st pers. 2nd pers. 3rd pers.	addressee referent	2nd pers. 3rd pers.

Figure 15. Relation of the feature of voluntary mobility to the category of person

List 1. Examples of naming units contrasting in terms of the initial variables in the two sets marked as to animateness and in the set unmarked as to animateness

Animate naming units with aggregate status:

haivañ	"cow, cattle"
kuavĭ	"deer"
taivig[ĭ]	"firefly"
vaamog	"mosquito"
cuuv[ĭ]	"rabbit"
?aą?ac	"headlouse"
cucul	"chicken"
kakaicu	"quail"
totoñ	"ant"

Animate naming units with individual type 1 status:

xoiga	"horse; pet"
visilo	"calf"
noviu	"castrated bull"
kaavul	"sheep"

Animate naming units with individual type 2 status:

baan	"coyote"
gogs	"dog"
ko?ovĭ	"rattlesnake"
maihogĭ	"centipede"

List 1. . (cont'd)

Animate naming units with mixed status:

xee?e	"wolf"
xuug	"mocking bird"
?uvhimal	"velvet ant"
siikī	"Sonora white-tail deer"
kolóodi	"a group of Papagos"

Inanimate naming units with aggregate status:

jia	"hailstone(s)"
juukī	"drops of rain"
cuukug	"pieces of meat"
sigal	"cigarette"
?ahid	"year"
ñi?okī	"words"
taatam	"teeth"
melhog	"ocotillo"
xaaḍ	"wild onion"
tohavs	"brittlebush"
vii-ho?i	"small cholla cactus"
vaxai	"grass, hay"
biibhiag	"morning glory (a creeper)"
vipnoi	"variety of cholla cactus"
pilkañ	"wheat"

List 1. (cont'd)

muuñ	"beans"
huuñ	"corn"
ñepi	"variety of squash"
baabas	"potatoes"

Inanimate naming units with individual type 1 status:

daikuḍ	"chair"
maagina	"car"
main	"sleeping mat"
?eñga	"clothes"
?iagta	"offering (such as a basket)"

Inanimate naming units with individual type 2 status:

bii	"food on a plate"
vasib	"liquid in a container with a wide opening (such as a glass)"
ciñ	"mouth"
mo?o	"head"
?a?an	"pair of wings"

Inanimate naming units with mixed status:

?ihug	"devil's claw"
xegai	"creosote bush"
kui	"mesquite"

List I: (cont'd)

?uupaḍ	"cat's claw"
?aḍavĭ	"buffalo gourd"
haaxañ	"saguaro cactus"

Naming units of the set unmarked as to animateness, all having mass status:

vaaga	"dough"
poxol	"corn gruel"
cu?i	"flour"
cevagĭ	"cloud(iness)"
toki	"cotton"
navait	"saguaro-cactus wine"
juukĭ	"rain"
jevuḍ	"soil"
maatai	"ashes"
mamaḍhoḍ	"water scum"
?o?ohia	"sand"

List 2. Examples of naming units contrasting in terms of the initial variables in the set of animals and the set of things

Naming units with aggregate status in the set of animals:

taḍai	"roadrunner"
haivañ	"cow, cattle"

Naming units with aggregate status in the set of things:

mo?o	"hair"
sigal	"cigarette"

Naming units with individual type 1 status in the set of animals:

toolo	"bull"
xoiga	"horse; pet"

Naming units with individual type 1 status in the set of things:

pilsa	"blanket"
navaitakuḍ	"jar for saguaro wine"

Naming units with individual type 2 status in the set of animals:

jevho	"gopher"
mavid	"mountain lion"

List 2. (cont'd)

Naming units with individual type 2 status in the set of things:

do?ag "mountain"
vuhi "eye"

Naming units with mixed status in the set of animals:

xee?e "wolf"
?uvhimal "velvet ant"

Naming units with mass status in the set of things:

cu?i "flour"
xuudagI "water"

List 3: Samples of naming units referring to entities with inherent and ascribed human and nonhuman status in different cultural contexts

List 3 A. Sample of naming units referring to entities with ascribed *human status* in the *waking state of folkloric reality* (set 3 A)

1. *Mythological beings*

   ?I?itoi (name of culture hero)

   Jevuḍ Maakai "Earth Medicine Man"

   Ho?ok (name of a monster)

2. *Mythical animals* (all except the dog?)

   ?U?vhig ?O?odham "Bird People"

   ?Al Ceecem ?O?odham "Insect People (lit.: little people)"

   Tokthoḍ ?O?odham "Spider Man"

   Jevho ?O?odham "Gopher Man"

3. *Mythical plants*

   Haaxañ "Saguaro Cactus"

   Huuñ "Corn"

4. *Mythical natural phenomena*

   Cevagĭ ?O?odham "Cloud Man"

   Hevel ?O?odham "Wind Man"

   Juukĭ ?O?odham "Rain Man"

   Xaxkaj ?O?odham "Mirage Man"

5. *Mythical celestial objects*

   Tax "Sun" (never called ?o?odham, but said to have legs and a house)

   Maxad "Moon" (said to be the mother of Coyote)

List 3 B. Sample of naming units referring to entities with inherent nonhuman status in the [illegible] state of folkloric reality (set 3 B)

1. Animals

only the dog (?)

2. Plants (most of them)

wild and cultivated trees and bushes

xegai	"creosote bush"
?ihug	"devil's claw"
kui	"mesquite"
tohavs	"brittle bush"
pilkañ	"wheat"
haal	"squash"
bavī	"beans"
viv	"tobacco"

3. Natural phenomena

tai "fire"

4. Natural objects

hohodai	"rocks"
xuudagī	"water"
jevuḍ	"soil"
do?ag	"mountain"
sivulogī	"whirlwind"
giohoḍ	"rainbow"

5. Man-made objects (all of them)

kii	"house"
giho	"carrying basket"
hua	"basket"
cu?i	"flour"

List 3 C. Sample of naming units referring to entities with ascribed *human status* in the *dream state of workaday reality* (sec. 4 A)

I. *Entities appearing in dreams in the shape of human beings*

1. *Animals*

huavī "mule deer"

ba?ag "eagle"

2. *Plants*

jenaxaḍ (a root)

3. *Natural objects*

morning star

4. *Parts of human beings*

scalp of an enemy

5. *Images of human beings*

effigy of a person

II. *Entities appearing in dreams or visions and "giving" songs to human beings (status as visitants not ascertained)*

1. *Animals* (see R. Underhill, *Singing for Power*, p. 6)

2. *Natural phenomena* (ibid.)

wind

cloud

III. *Entities appearing in dreams or visions as visitants (see fn. 96)*

1. *Animals*

all except huavī "mule deer" (see R. Underhill, *Papago Indian Religion*, p. 65)

2. *Plant*

the jenaxaḍ root in the shape of a lizard (see op. cit., fn. p. 89)

List 3 D. Sample of naming units referring to entities with inherent nonhuman status in the dream state of either folkloric reality (set 2 B) or workaday reality set 4 B; see fn. 103)

1. Natural objects

   mountains

2. Parts of birds

   white feathers

3. Images of birds

List 3 E. Sample of naming units referring to entities with inherent nonhuman status in the waking state of workaday reality (set 5 B)

1. Mythological beings

   ?I?itoi (name of culture hero)

   Ho?ok (name of a monster)

2. Ghosts

   Kokoi "Ghost"

3. Animals (all of them)
4. Plants (all of them)
5. Man-made objects (all of them)
6. Natural phenomena (all of them)
7. Natural objects (all of them)

FOOTNOTES

[1] See Charles O. Frake, "The Ethnographic Study of Cognitive Systems", Anthropology and Human Behavior, the Anthropological Society of Washington, p. 85, Washington, D. C., 1962.

It should be noted that the present inquiry does not deal with cognitive processes (also called intellective processes or representational processes) such as categorization, inference or generalization. It is uniquely concerned with the cognitive patterns that can be inferred from the observation of cultural behavior. For a discussion of the major difference between the anthropologist's (including the linguist's) and the psychologist's approach to cognition, see Roy Goodwin d'Andrade and A. Kimball Romney, eds., Transcultural Studies in Cognition, American Anthropologist, Vol. 66, No. 3. Part 2, June 1964, especially "Summary of Participants' Discussion", pp. 230-242. In this summary, the editors state: "We believe that the anthropologist focuses upon the study of learned codes shared by groups of individuals, while the psychologist focuses upon the intellective processes of the individual." (p. 230)

[2] A distinction is intended between a cognitive system and a conceptual system.

FN 2

As understood here, a cognitive system refers to the unformalized conception of reality -- or of aspects of reality -- held by a people. A conceptual system, on the other hand, refers to the formalized ~~system~~ conception of reality -- or of aspects of reality -- held by an analyst. Instances of conceptual systems are philosophical systems, mathematical systems, the systematic description of language or of culture.

The importance of the distinction proposed here is as follows: it allows for varying degrees of awareness on the part of the members of a culture of their own cognitive patterns. The analyst, on the other hand, strives for a high degree of awareness of the cognitive patterns which he aims to describe.

[3] More explicitly, the postulation of various degrees of integratedness of a language into a culture implies that the two theme structures may exhibit different degrees of congruence or discrepancy. Thus, no assumption is made regarding the specific way in which these two structures are related.

Note that no assumption is made, either, regarding the specific way in which the themes themselves are structured, as is the case in both Benedict's and Opler's approaches.

The specification of the type of structures constituted by the themes of the culture and the themes of the language, as well as the degree of their interrelatedness, is here regarded as part of the goal of the study and not of the initial hypothesis.

4 The postulation of two separate theme structures related to each other in varying degrees presented here is considered a reformulation of the Sapir-Whorf hypothesis. It is worth noting that at the outset of the present research, a less specific interpretation of the Sapir-Whorf hypothesis had been adopted: in stressing the relation between language and culture, the initial assumption allowed for the possibility of either one influencing the other -- i. e., either language influencing culture or culture influencing language -- without implying a necessary determinism between the two.

The postulation of the two theme structures is a further specification of the initial assumption. By rendering the latter more specific, the postulation of the two theme structures makes it more amenable to being tested. Within the scope of the present research, however, no testing was attempted. The aim is limited to gathering the information regarded as a prerequisite to the testing not only of the Sapir-Whorf hypothesis -- i. e., the extent to which language determines cultural behavior -- but also that of its opposite -- i. e., the extent to which cultural behavior determines the world view that is manifested in language (see fn. 126).

[5] In the section immediately following, an attempt is made to render explicit the assumptions which, in the course of investigating certain aspects of language, were observed to underlie the present approach. It should be emphasised that these assumptions were not explicit at the outset of the research. They emerged in the course of the actual conduct of the various individual investigations. This is in conformity with the requirements of the inductive method followed here: research should start out with ~~a~~ the minimum necessary amount of theoretical and methodological apparatus. The apparatus should be built up gradually on the basis of experience.

[6] The three functions of language as discussed here are taken from the work of Karl Bühler, the psychological theorist of the Prague School of linguistics. Bühler's terminology as translated by P. L. Garvin (see the latter's "Referential Adjustments and Linguistic Structure", Acta Linguistica, Vol. 4, No. 2, 1944, pp. 53-60) is used, except in the case of the primary function: the term "referential function" is preferred to Garvin's "representative function".

Roman Jakobson has proposed a more elaborate list of functions for language. For a presentation of Jakobson's frame of reference, see Dell Hymes, "The Ethnography of Speaking", Anthropology and Human Behavior, The Anthropological Society of Washington, pp. 29-38, Washington, D. C., 1962; see also Thomas A. Sebeok, "Analog and Digital Coding in Animal and Human Communication -- The Informational Model of Language", in Paul L. Garvin, ed., Natural Language and the Computer, p. 53, McGraw-Hill, New York, 1963.

The assumption that the primary function of language is more directly connected with cognition than the secondary functions of language is a commonly held one. This is clearly stated by B. L. Whorf in "A Linguistic Consideration of Thinking in Primitive Communities", reprinted in Dell Hymes, ed., Language in Culture and Society: A Reader in Linguistics and Anthropology, pp. 129-141, Harper & Row, New York, 1964: "Thinking may be said to be language's own ground, whereas feeling deals in values which language indeed possesses but which lie rather on its borderland." (p. 129)

The distinction between the various functions of language as specified here is compatible with the traditional distinction in psychology between "cognition, including learning, and dynamic psychology which deals with motivation and emotion." (Susan M. Ervin, personal communication)

For a general discussion of the cognitive and non-cognitive uses of language, see Paul Henle, ed., Language, Thought and Culture, chapter 6, University of Michigan Press, Ann Arbor, Mich., 1958.

[7] Referential meaning is regarded as involving both denotative and connotative meaning.

It should be noted that no systematic differentiation between denotative and connotative meaning is attempted in this study. An instance of a study that attempts to concentrate on the cognitive analysis of connotative meaning is A. Kimball Romney and Roy Goodwin d'Andrade, "Cognitive Aspects of English Kin Terms", in Roy Goodwin d'Andrade and A. Kimball Romney, eds., Transcultural Studies in Cognition, American Anthropologist, Vol. 66, No. 3, Part 2, pp. 146-170, June, 1964.

[8] These definitions result from a personal communication with Adam Schaff. For a detailed presentation of his position on the subject, see his Introduction to Semantics, Pergamon Press, New York, 1963, particularly pp. 212-301.

It is interesting to note that the distinction between linguistic system, semantic system and cognitive system is not retained by all analysts dealing with language and cognition. As stated by Romney and d'Andrade in their "Introduction" to Transcultural Studies in Cognition (American Anthropologist, Vol. 66, No. 3, Part 2, June, 1964), on the one hand "The linguist tends to enter the field of cognition through language, sometimes equating linguistic processes with cognitive processes" (p. 2); on the other hand "One characteristic of the ethnographic papers is the tendency to equate semantic features with cognitive distinctions..." (p. 3)

9 These characteristics could be said to constitute the "common denominator" underlying the meaning variants exhibited by the pertinent meaning units. The term "common denominator" used to qualify semantic distinctive features is taken from W. Goodenough, "Componential Analysis and the Study of Meaning", Language, Vol. 32, No. 1, p. 197, fn. 5, 1955.

Note that what is here called "semantic distinctive features" seems to correspond to Goodenough's "basic components of signification" (see op. cit., p. 198, fn. 6, p. 205 and p. 208), except for the fact that his concept covers only denotative meaning, whereas the concept of semantic distinctive feature as understood here covers both denotative and connotative meaning. (See fn. 7).

10 For a more detailed discussion of the distinction between behavioral units and analytic units, see Madeleine Mathiot, "The Place of the Dictionary in Linguistic Description -- Problems and Implications", Language, (forthcoming).

11 Note that it is not proposed here to study the cognitive content of invididual linguistic units (such as words) in isolation. Units are viewed either as members of a category (such as a class or subclass) or as sharing a given property. In the present approach, then, a given category, a given property, are studied through the

units that either constitute the category or are affected by the property.

12 It is believed that although categories may be similar in different languages, they are never identical. Thus, the two categories investigated in the course of this research, namely those of number and person, have their counterparts in English which exhibit a certain resemblance to them but are not identical with them.

With units and properties, on the other hand, it is believed that some are shared by all languages whereas others are not. Thus, all languages have morphemes (minimal grammatical units) and lexemes (minimal lexical units). It is not a demonstrated fact, however, that all languages have words as units of a different order from morphemes. The property of fusion investigated in the course of this research is a universal property. Monosyllabism, the property of having a single syllable per breath group, is alleged to be characteristic of some South East Asian (and perhaps some American Indian) languages.

13 What is meant by cultural categorization of reality as opposed to cultural segmentation of reality is most easily conveyed by examples taken from the lexical dimension.

An example of the cultural categorization of reality in the American English language-and-culture situational context is the following: the members of the culture refer to various types of horses by the same linguistic label ("horse"). The use of a single label shows that all horses are regarded as being similar to each other in spite of the wide differences that exist between different varieties of horses. The various parts of a horse (such as hoof, pastern) that are distinguished by the language, on the other hand, provide an instance of the cultural segmentation of reality.

Of the three linguistic aspects investigated in the course of this research, two relate to the cultural categorization of reality (the categories of number and person), and one relates to the cultural segmentation of reality (the property of grammatical and lexical fusion).

[14] The classical example of form-meaning covariance is a grammatical paradigm in which there is a variation of linguistic forms the meanings of which vary with them. With homophones (or homographs), however, there is no form-meaning covariance: the form remains the same while the meaning varies.

For a discussion of the utilization of the form-meaning covaraance in informant work, see Paul L. Garvin, "The Definitional Model of Language", in Paul L. Garvin, ed., Natural Language and the Computer, McGraw-Hill, New York, 1963, p. 12,

[15] It is highly probable that any grammatical category has cognitive significance. It remains to be ascertained

whether or not this is also true of grammatical properties.

In view of the present lack of systematic knowledge about the lexical dimension of language, it is difficult to advance a guess about the cognitive significance of either lexical categories or lexical properties (see fn. 39).

[16] It should be kept in mind that the term "possessiveness", as well as the other terms referring to grammatical categories such as "number", "person", "animateness", are used to designate Papago linguistic aspects. They should not be identified with the same terms applied to categories in Indo-European languages of Western cultures.

[17] The Papago examples are cited in the orthography proposed by the author for use by the Franciscan missions. The following symbols have phonetic values other than the usual ones:

e represents the high back unrounded vowel;

İ represents the voiceless high front unrounded vowel;

double vowel letters are used to represent long vowels;

ḍ represents the retroflex alveolar stop;

c and j represent the fortis and lenis palatal affricates;

x represents the voiceless retroflex prepalatal spirant.

Primary stress is indicated by an acute accent (´) only if it does not obey the following rules: with a single-base naming unit, the primary stress is on the first syllable; with a multibase naming unit (see section [illegible]) — either compound or multiword — the primary stress is on the first syllable of the head.

In all the Papago examples cited, single hyphens (-) indicate the boundaries between the components of compounds; double hyphens (=) to indicate morpheme boundaries are used only when this facilitates the literal translation.

In the English translations of the Papago examples, single hyphens (-) are used to connect several English words serving to translate single Papago words; two consecutive hyphens (--) are used to indicate the boundaries between English expressions that are the translations of components of Papago compounds.

[18] This is in keeping with most anthropologists' position regarding the study of culture. As stated by Lévi-Strauss and Needham and reported by Roy Goodwin d'Andrade and A. Kimball Romney (Transcultural Studies in Cognition, American Anthropologist, Vol. 66, No. 3, Part 2, p. 231, June 1964) "...social structure does not consist of actual interpersonal behaviors but of the organization

of relationships being expressed in these behaviors." As further stated by d'Andrade and Romney, "Generally these positions appear to treat behavior as signals, the anthropologist's task being to investigate the code that makes these signals intelligible."

[19] Speech behavior and naming behavior are not the only conceivable modalities of verbal behavior. A verbal activity such as playing with words may be considered an instance of another type of verbal behavior, one in which the distinguishing characteristic is that the speech sign attracts attention to itself. This type of behavior, the more organized varieties of which include the creation of literature and poetry, can be called "poetic behavior".

Note that for the observation of verbal behavior, naïve native speakers are preferred while literate native speakers are avoided. Naïve native speakers being subjected to fewer contradictory influences, their responses are more consistent and therefore easier to interpret.

[20] Two types of phenomena manifested in speech behavior have been identified so far (see op. cit. in fn. 10). They are relational phenomena corresponding broadly to "events" and gradual phenomena corresponding broadly to "qualities". The manifestations of speech behavior, such as part-clauses and phrases, which refer to relational or gradual phenomena

are called *designations*. Designations referring to relational phenomena are called Connections ~~*predications*~~; designations referring to gradual phenomena are called *qualifications*.

It should be emphasized that there is no one-to-one correspondence between either connections ~~predications~~ or qualifications and certain parts of speech. A study of Connec ~~predica~~tions in English has shown that they may include not only verbs, but also nouns, adjectives and conjunctions (see Paul L. Garvin, Jocelyn Brewer and Madeleine Mathiot, *Predication-Typing, A Pilot Study in Semantic Analysis*, *Language Monographs* [forthcoming]).

It should also be emphasized that Connections ~~predications~~ and qualifications are here regarded as part of the lexicon. They should therefore be included in the data base for the cognitive study of language (see section 2. 1. 1. below).

21 The significance of folk taxonomy has recently been discussed by Conklin and Frake (see Harold C. Conklin, "Lexicographic Treatment of Folk Taxonomies" in Fred W. Householder and Sol Saporta, eds., *Problems in Lexicography*, pp. 119-141, Bloomington, Indiana, 1962; see also Charles O. Frake, "The Ethnographic Study of Cognitive Systems", *Anthropology and Human Behavior*, The Anthropological Society of Washington, pp. 72-85, Washington, D. C., 1962.

In the present approach folk taxonomy is considered a variety of naming behavior and is therefore regarded as a behavioral manifestation of the lexical dimension of language.

[22] Dell Hymes, op. cit. in fn. 6, speaks of "contrast within a set" (p. 7), also of "contrast within a relevant ~~fxxxx~~ (valid) frame" (p. 18).

[23] For a detailed discussion of these units, see op. cit. in fn. 10. The distinction between the three types of lexical units listed here is based on their respective substitution potential: single lexemes have no substitution potential; lexeme clusters have a limited substitution potential; lexeme conjuncts have a relatively unlimited substitution potential. Examples in English are: for a single lexeme -- crackpot; for a lexeme cluster -- coffee pot (tea pot, etc.); for a lexeme conjunct -- big pot (red pot, expensive pot, beautiful pot, etc.).

[24] Informant words are speech forms obtained in the course of eliciting paradigms as translations of short utterances. Their boundaries therefore depend on the elicitation question used by the investigator.

[25] In the course of the research mentioned in fn. 20, a

technique for the collection of ~~predications~~ connotations has been developed. It is based on the controlled paraphrasing of the sentences of texts by native speakers acting as subjects in a paraphrasing experiment. Control is achieved by presenting the subjects with a prepared list of paraphrases from which they are directed to choose that which applies (including the option "none applies"). The lexical behavioral units in this case are the forms which the subjects feel have prompted the choice of a particular paraphrase. These forms are called cue forms.

[26] Note that, by contrast, in the grammatical dimension there is no such correspondence between analytic units and behavioral units: not all grammatical units are also informant words.

[27] Note that cultural variables are defined negatively: any condition of variation that affects the linguistic system but cannot be stated in terms of the description of that system (i. e., either in grammatical or in lexical terms) is considered cultural.

[28] The position held here is in keeping with Sapir's statement that "language is an essentially perfect means of expression and communication among every known people" (see his "Language" in David G. Mandelbaum, ed., Selected Writings of Edward Sapir in Language, Culture and Personal-

ity, p. 7, University of California Press, Berkeley and Los Angeles, Calif., 1949), and with cultural relativism. In other words, it is believed that in all languages there are means for referring to everything, but that these means may differ greatly from one language to the next. Thus, although there may not be a category of gender in a given language, there are still ways of differentiating between males, females and asexual entities (e. g., through the lexicon). The category of gender, therefore, is regarded as manifesting a probable universal concept, namely, one having to do with the identity of entities (see fn. 32). For a list of the aspects of language that manifest the concept of identity in Papago, see section 4. 2. 1. 1. 3. 1.

The assumption behind the hypothesis advanced here is that of the psychic unity of mankind. For a discussion of this topic, see Anthony F. C. Wallace, "The Psychic Unity of Mankind" in Bert Kaplan, ed., _Studying Personality Cross-Culturally_, pp. 129-164, Harper & Row, New York, 1961.

29 It is worth noting that native speakers -- or actors -- are not likely to be aware of the underlying concepts postulated by the analyst, although they may be aware of some of their manifestations. Thus, it is very unlikely that the Papagos are aware of the existence of a concept of multiplicity as being manifested in the category of nominal number. They seem, however, to

be aware of the importance of entities being close together or dispersed (see section 3. 2. 1. 4. 1.), the manifestation of the concept of multiplicity that is peculiar to the Papago language-and-culture situational context.

30 Thus, the analysis of the category of nominal number in Papago contributes to an understanding of the more elaborate situation found in the case of verbal number.

It seems that to the semantic distinctive features of the one category of nominal number (see section 3. 2. 1. 3. 1. 2.) there correspond several categories of verbal number (see Diagram VII), as follows: to the two semantic distinctive features of singleness of locus and multiplicity of locus, there seems to correspond~~s~~ the one category of situational number. To the semantic distinctive feature of singleness of entity, there seem to correspond two categories: that of actor/acted-upon number and that of agency number. In addition, one category seems to be restricted to verbal number and not to have an analog in nominal number: action/event number.

31 Thus, the meaning variants that correspond to a given aspect of language allow (1) inference of ~~to infer~~ the semantic distinctive features of that aspect, and (2) postulation of ~~to postulate~~ the underlying concept that it manifests.

[32] Another example is the category of gender in English. The carriers of this category xx are the personal pronouns he:she:it, him:her:it, himself:herself:itself, the possessive adjectives his:her:its, and the possessive pronouns his:hers:its.

A pilot study conducted by the author suggests that the underlying concept is that of identity (see fn. 28). The concept is postulated on the basis of the range of meaning variation of the category of gender, as revealed by the naming units that can either cooccur with, or replace, the carriers of the category of gender. These naming units are observed to refer to all the entities singled out by the culture. It is concluded, therefore, that to the distinctions displayed by the category of gender there correspond distinctions concerning the identity of entities as viewed by the culture.

[33] Note that the procedure proposed here for ascertaining distinctive features is an instance of what Dell Hymes calls "structural semantics" (see op. cit. in fn. 6, p. 17). It is in the tradition of Roman Jakobson's analysis of the semantic distinctive features of the Russian verb and the Russian case system (see his "Zur Struktur des russischen Verbums", *Charisteria Guilelmo Mathesio Quinquagenario... oblata*, pp. 74-84, Cercle Linguistique de Prague, Prague, 1932, and his "Beitrag zur

[illegible] Kasuslehre", Travaux du Cercle Linguistique de Prague, Vol. 6, pp. 240-288, 1936). For an application of structural semantics to the study of kinship terms, see Floyd G. Lounsbury, "A Semantic Analysis of the Pawnee Kinship Usage", Language, Vol. 32, No. 1, pp. 156-194, 1956).

It is worth stressing that in ascertaining ~~the~~ semantic distinctive ~~µ~~ features of a given aspect of language the "native contexts of use" (see Dell Hymes, ibid., p. 19) are of crucial importance. Thus, in investigating the semantic distinctive features of the category of nominal number in Papago, experience showed that questions such as the following were pertinent: "What do you say when referring to several chairs in a single room? to several chairs in different rooms of the same house? to several chairs in different houses?" "What do say when referring to several persons (Papagos) from ~~different~~ the same village~~s~~? to several persons (Papagos) from different villages?"

34 The notions of privative opposition, gradual opposition and equipollent opposition are taken from N. S. Troubetzkoy (see his Principes de Phonologie, J. Cantineau, transl., Klincksieck, Paris, 1949, especially pp. 76-80).

Troubetzkoy's definitions are as follows (p. 77):

"a) Les oppositions *privatives* sont celles dans lesquelles un des termes de l'opposition est caractérisé par l'existence d'une marque, l'autre par l'absence de de cette marque...

b) Les oppositions graduelles sont celles dont les termes sont caractérisés par différents degrés de la même particularité...

c) Les oppositions équipollentes sont celles dont les deux termes sont logiquement équivalents, c'est-à-dire ne peuvent être considérés ni comme deux degrés d'une particularité, ni comme la négation et l'affirmation d'une particularité..."

35 A clearcut case of the neutralization of an opposition is that of single entity versus several entities in the distributive (see the analysis of the category of nominal number in section 3. 2. 1. 3. 1. 2.). In most of the cases of privative oppositions recorded in the course of this research, however, it has not been possible to ascertain whether or not the oppositions could be neutralized. As a consequence, the decision as to their type was made on purely impressionistic grounds.

36 See Madeleine Mathiot, "Noun Classes and Folk Taxonomy in Papago", American Anthropologist, Vol. 54, No. 2, 1962, pp. 340-50; reprinted in Dell Hymes, ed., Language in Culture and Society: A Reader in Linguistics and Anthropology, pp. 154-163, Harper & Row, New York, 1964.

37 It is important to note that the results obtained by ap-

plying the revised step sequence are not radically different from those obtained by applying the initial step sequence. They are better in two respects. On the one hand, they go deeper: the initial step sequence yielded only the basic cognitive content of a given aspect of language and not the ramifications of its cognitive content (see op. cit. in fn. 36), while the revised step sequence yields both. On the other hand, the results obtained by applying the revised step sequence are better accouted for. Therefore, they meet the criterion of logical reliability better (see section 6. 2.).

[38] Note that folk-taxonomic classes which in the Pilot Study (see fn. 36) were considered cultural variables are now considered linguistic variables, more specifically lexical variables (see fn. 21).

Note also that, while in the Pilot Study cultural variables were investigated subsequent to linguistic variables, the present position is to investigate every cultural variable together with the linguistic variable with which it is associated.

[39] It would be of special interest to test whether the revised step sequence applies to the lexical dimension, for instance, to lexical classes (color terms, disease terms, etc.)

40 The goal of these four tasks is to provide an answer to the very difficult question of "how do you know where to start". According to Roger Brown, students of ethnoscience have started "All over the place -- with firewood, kinship, botany, colors, numeral classifiers, and gasi. Frake has hit on the only principle that could possibly summarize this practice: 'Indeed, short of a complete description of a culture, the preferable strategy is probably to focus in depth on a variety of domains ...' (p. 43). But this is a strategy that can be realized in so many ways that it gives little guidance." (*Transcultural Studies in Cognition*, Roy Goodwin d'Andrade and A. Kimball Romney, eds., *American Anthropologist*, Vol. 66, No. 3, Part 2, June, 1964, p. 246).

For a discussion of the topic of how to start, see also Stanley Newman, "Semantic Problems in Grammatical Systems and Lexemes", in Harry Hoijer, ed., *Language in Culture*, *American Anthropologist*, Memoir 79, pp. 82-91 (1954).

41 Note that the terminology adopted here is different from that used in the Pilot Study. The terms citation form and derived form(s) are introduced in order to accomodate the case in which a singular is reduplicated. An example of a nonreduplicated citation form contrasting with two derived forms (namely plural and distributive) is: *daikud* "chair (sg.)" versus *dadaikud* "chairs (pl.)" and *daddaikud* "chairs (distr.)". An example of a reduplicated citation

form contrasting with one derived form (namely the distributive) is: ?o?odham "person(s), Papago(s) (sg/pl.)" versus ?o??odham "person(s), Papago(s) (distr.)".

[42] The property of fusion as it applied to the phonological dimension has been described by Charles F. Hockett as follows: "Ultimate phonologic constituents do not occur in an utterance as the individual bricks occur in a row of bricks. Rather, they occur in clusterings, these occur in still larger clusterings, and so on, up to the level of the whole utterance." (see his Manual of Phonology, Baltimore, 1955, p. 43).

[43] Before the term "individualness" was finally adopted, terms such as "terminological unity" and "terminological oneness" had suggested themselves.

Note that in the initial version of the Case Study the notion of the underlying concept as the link between the linguistic data and the cognitive dimension was at first missing. The groping for an adequate formulation of the cognitive problem area centered then on the specification of the linguistic aspect under investigation. This is reflected in the two statements that were successively proposed to specify the cognitive problem area before the notion of underlying concept was taken into account. The first statement described the cognitive problem area as consisting of the relation of multibase naming units (see fn. 50) to the cognitive system. The [illegible] [illegible] described the cognitive problem area as consisting of the relation of the grammatical process of compounding and of the lexical internal structure of naming units to the cognitive system.

As formulated in the revised version of the Case Study, the cognitive problem area is said to include all the aspects of language that manifest the concept of individualness (see section 3. 1. 1. 3. 1).

44 Note that in Jashua Fishman's formulation of what appears to be the same cognitive problem area, only the grammatical dimension is taken into account. Thus he distinguishes between "culturally encoded phenomena" -- which he defines as phenomena that can be named with a single word -- and phenomena which are "not culturally encoded" -- which he defines as phenomena that require a phrase, often an individually formulated phrase, in order to be described (see his "A Systematization of the Whorfian Hypothesis", Behavioral Science, Vol. 5, No. 4, Oct. 1960, p. 329).

45 It should be emphasized that cognitive relatedness is not the same as linguistic relatedness. The linguistic aspects that share a given underlying concept -- and therefore are said to be cognitively related -- do not have to be linguistically related or even linguistically similar. Cognitively related linguistic aspects may therefore include grammatical categories and lexical classes.

These categories can be specified as follows:

The category of pronominal numbers has two members, disperse referent and nondisperse referent. A complete list of the personal pronouns that display the category of pronominal number appears in figure 13.

The category of adjectival/adverbial number has two members, single referent and multiple referent. An example of an adjective displaying the category of adjectival/adverbial number is *komalk* (single referent) versus *ko?okmalk* (multiple referent) "thin". Examples of adverbs displaying the category of adjectival/adverbial number are, on the one hand *komal* (single referent) versus *ko?okmal* (multiple referent) "thinly", on the other hand *skopoñim* (single referent) "with a single popping noise" versus *skokpkim* (multiple referent) "with repeated popping noises".

Four categories of verbal number are distinguished. They are: the category of actor/acted-upon number, the category of agency number, the category of situational number, the category of action/event number.

The category of actor/acted-upon number has four members: the pair singular subject (sg.s.) versus plural subject (pl.s.), and the pair singular object (sg.o.) versus plural object (pl.o.). In most cases these two pairs are mutually exclusive. They are manifested either by reduplication or by suppletion.

Examples of the two pairs manifested by reduplication are: *him* (sg.s.) versus *hihim* (pl.s.) "to walk" and *gevkad* (sg.o.) versus *gevpkad* (pl.o.) "to stiffen, strengthen, starch *obj*.".

Examples of the two pairs manifested by suppletion are: *meḍ* (sg.s.) versus *vopoʔo* (pl.s.) "to run" and *muʔa* (sg.o.) versus *kohda* (pl.o.) "to kill *obj*."

In the few cases in which they are not mutually exclusive, the two pairs have been observed to be manifested by double suppletion. One such example is offered by the several forms translating as "to go and get *obj*. for someone":

sg.o.		pl.o.
behida=meḍ	sg.s.	ʔuʔida=meḍ
hehid=o	pl.s.	ʔuʔid=o

The suppletive elements *behida=* and *ʔuʔida=* correspond to the meanings "to get *sg.o.* for someone" and "to get *pl.o.* for someone" respectively. The suppletive elements =meḍ and =o correspond to the meanings "to go and ... (sg.s.)" and "to go and ... (pl.s.)" respectively.

The category of agency number has two members: single agency (sing.) and multiple agency (mult.). Examples of verbs displaying the category of agency number are: *dagxp* (sing.) "to press, push *obj*. down once with one hand, or with one finger of one hand" versus *dadagxp* (mult.) "to press, push *obj*. down once with both hands, or with fingers of both hands"; *dagxap* (sing.) "to press, push *obj*. down repeatedly with one hand, or with one finger of one hand" versus dadaɣmxap (mult.) "to press, push obj. down repeatedly with both hands, or with fingers of both hands"; huɣ- "to eat obj. once, or for the first time" versus ku?a "to eat obj. regularly"; hab ce?i- "to speak briefly (i. e., to emit one utterance) versus hab kaij "to speak at length (i. e., to emit several utterances)".

The category of situational number has three members, the unitive, the repetitive and the distributive. By situation is meant the entire context in which an action or event is taking place. The distinction between the three members of the category is as follows: the unitive implies a single situation; the repetitive implies several situations in which the same actor(s) or agent(s) is/are involved; the distributive implies several situations in which different actors or agents are involved. An example of a verb displaying the three members of the category of situational number is behe (unitive) "to get obj. (sg.) once" versus bebb(h)e (repetitive) "to get obj. (sg.) repeatedly (used when referring to the same actor(s])" versus beeb(h)e (distributive) "to get obj. (sg.) here and there (used when referring to each of several actors in several locations)".

The category of actor/event number has four members, of which three are marked and one unmarked. The three marked members of the category are the semelfactive (markers =ñ, =n), the recursive (marker $\overset{ʔ}{=}$d̨), and the reiterative (markers =x, =ke). This category has to do with the number of times a given action or event occurs within a single situation. Unlike the case of the other categories of number, with the category of action/event number no single verb theme can display all four members. The following combinations have been found: (a) unmarked versus reiterative, as with da?idc "to reach the top once" versus da?idce=x "to reach the top reiteratedly (like boiling milk)"; (b) semelfactive versus reiterative, as with vuuxa=ñ "to come out of the ground, to emerge, once" versus vux=ke "to come out of the ground, to emerge, reiteratedly", or with ?uli=n "to hand out obj. once" versus ?uli=x "to hand out obj. reiteratedly (by extending and retracting one's hand)"; (c) unmarked versus recursive versus reiterative, as with ?u?apa "to bring back obj. once" versus ?u?apa=d "to bring back obj. again and again (at irregular intervals)" versus ?u?apa=x "to bring back obj. reiteratedly (at regular intervals)".

47 The differentiation between external functioning and internal structure is stressed by Paul L. Garvin, op. cit. in fn. 14, pp. 18-19.

48 Note that in the Pilot Study the category of nominal number was called "number category". The longer term is now preferred, since it allows one to distinguish various categories of number, such as nominal number, pronominal number and verbal number (see fn. 46).

49 Considerations of ~~xxx~~ grammatical internal structure would have entailed the study of differences of the following sort: Among naming units consisting of modifier-head constructions, ceedagĪ huuñ "fresh corn" contains a modifier in the singular (ceedagĪ), whereas cehedagĪ-huuñ "blue corn" contains the same modifier in the plural (cehedagĪ).

50 Single-base units are single words that contain only one base or stem. Note that this limitation does not apply to the folk-taxonomic labels that constitute the additional lexical variables investigated in the second part of step 4. One of the two labels used in the Follow-up Study, ha?icu doakam "animals", is a multiword naming unit (see section 3. 2. 3. 2. 1. 1.).

51 This condition, namely that of naming units being themselves the carriers of the linguistic aspect under investigation, was originally thought to be the only condition of relevance. Thus, in terms of Pike's concepts of "slot" and "fillers" (see Kenneth L. Pike, Language in Relation to a Unified Theory of the Structure of Human Behavior, Summer Institute of Linguistics, Glendale, Calif., Vol. 1, 1954, especially pp. 152-153), the linguistic aspect under consideration would be the "slot" and only the naming units that are the "fillers" of the slot were at first thought to be relevant.

[52] An additional distinction suggests itself. It consists in differentiating between unreduplicated citation forms and reduplicated citation forms (see section 3. 1. 1. 1). The assumption is that unreduplicated citation forms are found with names of entities that are viewed as inherently singular, reduplicated citation forms are found with names of entities that are viewed as inherently multiple. The implication of the above is that there are two modalities of multiplicity in Papago: inherent multiplicity and circumstantial multiplicity. In the present study only the latter is investigated.

Instances of entities referred to by naming units with the same subclass membership status, but contrasting in terms of inherent multiplicity, are: for mass status — xuudagĭ "water" (inherently singular) versus namadhod "water scum" (inherently multiple); for aggregate status -- haivañ "cattle, cow" (inherently singular) versus kakaicu "quail(s)" (inherently multiple).

[53] Note that in the Follow-up study the definition of both individual and mixed statuses is different from that proposed in the Pilot Study (see op. cit. in fn. 36, p. 341). Instead of a single type of individual status, as in the Pilot Study, two types are now distinguished. Instead of two types of mixed status, as in the Pilot Study, a single type is now preferred. The further differentiation of individual status into individual type 1 status (see pattern 3 in section 3. 2. 1. 3. 1. 2) and individual

type 2 status (see pattern 4 in section 3. 2. 1. 3. 1. 2) is justified by the subsequent analysis. Thus, the cognitive distinctive feature of potentiality for grouping in a single locus is shown to apply differently to the two types of individual status: it is present in the case of individual type 1 status, and absent in the case of individual type 2 status (see section 3. 2. 3. 2. 3). The lumping together of the two types of mixed status, on the other hand, in only a precautionary measure. The distinction that served to differentiate the two types is one of free variation versus positional variation. Under both conditions of variation, mixed status displays the same alternation between aggregate status and individual type 2 status (see pattern 5 in section 3. 2. 1. 3. 1. 2). On the basis of the present analysis, it is proposed that the important distinction is not one of different conditions of variation but one of alternation between different statuses. Additional field work is needed to validate this assumption further.

54 The definition of the word in Papago includes compounds, i. e., single words containing more than one base or stem.

The word class pertinent to the investigation is that of nouns. These are defined by the nominal inflectional set which includes the person markers (see figure 7B), the instrumental suffix =kaj "by means of", and several locative suffixes preceded by a link (=t= or =c=), such as =c=?ed "inside", =t=~~?ajed~~ ?amjed "from" and =t=?am(a?i) "at the base of".

Compound nouns take the same inflectional set as single-base nouns.

55 Contrastive examples of positional variation are: (1) in context no quantifier versus ha?i + noun -- Nap ñeid g haaxañ ?ama?i? "Do ~~x~~ you see the saguaro cactus down there?" versus Nap ha?i hañeid g hahahañ ?ama?i? "Do you see several saguaro cacti down there? (implied that they are not in a cluster)"; in context smu?ij + noun -- Smu?ij g haajañ ?ab Jevak ?ab. "There are a lot of saguaro cacti at Covered Wells." versus Smu?ij g hahahañ hahasko. "There are a lot of saguaro cacti here and there."

56 This semantic opposition is revealed by the pertinence of the questions listed at the end of fn. 33 to illustrate the importance of the "native contexts of use".

57 In using behavioral tests, three possible responses are obtained: unambiguously positive, unambiguously negative, indefinite or ambiguous. The third type of response is considered very significant because it is assumed ~~xhax~~ to reveal a third type of condition which often may correspond to a state of transition.

In the present case, the potentially low degree of individualness seems to represent a state of transition in which there is the possibility of the formation of of a new lexeme cluster.

58 This is a corollary of the differentiation of single lexemes and lexeme clusters on the basis of their respective substitution potential (see fn. 23).

59 Note that the lack of correlation between grammatical fusional status and amount of individualness is interpreted as pertinent to the concept of individualness. Consequently, the grammatical fusional statuses of multibase naming units remain among the initial variables.

Note also that, although the grammatical fusional statuses of multibase naming units do not enter into the uncovering of the basic cognitive content of the nonextreme manifestations of the property of fusion, they do enter into the uncovering of the ramifications of that linguistic aspect (see section 3. 2. 4. 1).

60 See op. cit. in fn. 36, p. 348. Note that the reference to time which was present in the Pilot Study is eliminated here. With concrete entities, only the spatial dimension seems to be pertinent.

61 The unnaturalness of this type of perception results in surprise or amusement, two feelings which are easily observable. The investigator was told, with a great deal of amusement on the part of the informant, of a child who refuses to eat dates because of their

name (*cukud-zoxa* lit.:"owl's--nose-phlegm").

It seems that the Papagos utilize the unnatural perception of the constituent parts of multibase naming units for the purpose of making puns.

62 Note that native speakers willvolunteer, or can easily be trained to supply, folk definitions of the type "a tea pot is a pot to make tea" which reveal an awareness of the constituent parts of the naming unit "tea pot". This awareness on the part of the native speaker is exploited by the analyst in specifying the substitution sets to which given lexeme clusters belong. Thus, since a "tea pot" is a pot to make tea and a "coffee pot" is a pot to make coffee, they can be said to belong to the same substitution set. Since, on the other hand, a "flower pot" is not a pot to make flowers but one in which flowers are growing, it does not belong to the same substitution set as "tea pot" and "coffee pot".

63 Since the Papago folk-taxonomic system is not yet known, the term "class" is used in a very broad sense to refer to any grouping of terms.

64 For a description of folk-taxonomic elicitation, see op. cit. in fn. 36, p. 343. See also Charles O. Frake, "Notes on Queries in Ethnography", in Roy Goodwin d'Andrade and A. Kimball Romney, eds., *Transcultural Studies in Cognition*, *American Anthropologist*, Vol. 66, No. 3,

Part 2, June 1964, pp. 132-145.

For a detailed description of the collection of data from texts using folk-taxonomic labels, see section 4. 2. 2. 2. 1. 1. 2.

[65] In Papago the category of animateness is, using Whorf's terminology, a "cryptotype". i. e., a grammatical category for which there is no overt marker (see his "Thinking in Primitive Communities", in John B. Carroll, ed., *Language, Thought and Reality, Selected Writings of Benjamin Lee Whorf*, Technology Press, Cambridge, Mass., 1956, p. 70). Note that in the Pilot Study the relevance of the cryptotype of animateness to the cognitive analysis of the category of nominal number was observed but was left unexplored.

[66] Compare to Whorf's definition of mass nouns in English ("The Relation of Habitual Thought and Behavior to Language" in op. cit. in fn. 65, p. 140): "Mass nouns denote homogeneous continua without implied boundaries". Note that the lack of implied boundaries was the characteristic attributed to entities with mass status in the Pilot Study (see op. cit. in fn. 36, p. 341).

[67] Compare to Whorf's interpretation of Hopi nouns "translating most nearly" English mass nouns: "The noun itself implies a suitable type-body or container." (op. cit. in fn. 66, p. 141). In Papago the actual shape

of inherently unbounded entities is often indicated by a verbal expression. Thus one refers to a "pile of sand" in a given location as *ha?as ?i daxvis g ?o?oḍ [+ locative]* "the sand (*?o?oḍ*) forms a pile of a certain size [somewhere]". It is worth emphasizing that inherently unbounded entities, as defined here, do not include entities which consist of substances that are not viewed independently of their containers. Examples are naming units such as *vasib* "liquid in a container with a wide opening (such as a glass or cup)", *va?igĪ* "liquid in a container with a narrow opening (such as a jar)", or *bii* "food on a plate". None of these have mass status. The latter entities raise the problem of the Papago conception of the relation between containers and their contents, a problem requiring separate investigation beyond the scope of this study.

68 Note that since the Papago naming unit that corresponds to "cloud", *ceedagĪ*, is a mass noun, it is best translated as "cloudiness". This is an instance of two cultures viewing the same entity differently: in the American English language-and-culture situational context, the entity is viewed as having boundaries; in the Papago language-and-culture situational context, the same entity is viewed as having no definite boundaries.

69 It remains to be investigated how such mixtures are viewed by the members of Papago culture, i. e., whether they are viewed as a mixture of two or more entities or

as a new entity.

70 The folk-taxonomic classes investigated in the Pilot Study (see op. cit. ~~x~~ in fn. 36, pp. 346-347) are included in these two broad folk-taxonomic classes as follows:~~a~~ the folk-taxonomic class of "birds" is included in the broad folk-taxonomic class of "animals"; the five folk-taxonomic classes of "plants" are included in the broad folk-taxonomic class of "things".

71 It remains to be ascertained whether ~~xx~~ the distribution of naming units with mixed status presented here is due to chance (e. g., an incomplete sample) or is a patterned phenomenon.

72 Note that the relation of external association between a given entity and its owner or user is not the same as that of possession.

73 A change of name accompanying a change of status is exemplified by the case of the horse. A "domesticated horse" is called kaviu (individual type 1 status). A ~~xxxx~~ "wild horse" or a "herd of wild horses" is called manaiu (aggregate status). An interesting case is that of the dog. As shown by its individual type 2 status, ~~x~~ the dog is nonassociated. This is interpreted to mean that the dog is viewed as independent of man. This is confirmed by casual observation in the field: Papago

dogs are left to roam without supervision.

[74] Examples of naming units with mixed status appear in List 1 and List 2. Pairs of naming units referring to similar entities have been found to contrast on the basis of mixed status as opposed to non~~no~~mixed status. Examples are: *siikĪ* "Sonora white-tail deer" (mixed) versus *huavĪ* "mule deer"(aggregate); *kolóodi* "Kolodi Papago(s)" (mixed) versus *?o?odham* "person(s); Papago(s) (including Pima[s])" (aggregate). It is assumed that to these differences in subclass membership there corresponds a difference in the way in which these entities are viewed by the culture.

[75] A head is here defined as that component of a linguistic unit which determines its grammatical external functioning.

[76] It should be noted that this lexeme is often abbreviated to the single-base unit *kostal*. This is interpreted as an instance of base fusion (see section 3.2.4.1.3).

[77] The process of base fusion itself, as specified here, is interpreted as a manifestation of a broader process called "intellectualization" by the Prague School of linguists. As interpreted by Paul L. Garvin, "intellectualization... refers to the requirement of increasing accuracy along an ascending scale of functional dialects from conversational to scientific." (See his "The Standard

Language Problem -- Concepts and Methods", *Anthropological Linguistics*, Vol. 1, No. 3, March, 1959, p. 28). The hypothesis underlying this interpretation is that intellectualization is manifested by different degrees of specialization in the various areas of the lexicon.

78 In order to observe the process of base fusion it is necessary to have evidence regarding consecutive states of the same language.

79 It could not be ascertained whether or not the phonological segments that are omitted correspond to morphemes.

80 It is very likely that the three fusional processes identified here, compounding, truncation and abbreviation, do not exhaust all possibilities. Cases of base fusion were observed which can not be interpreted in terms of these three processes, either individually or in combination. These cases therefore suggest that an additional fusional process is at play, which, however, can not be further specified at this stage. Two such cases are exemplified by the naming units *civi-cúuc*, name of a bird, and *ban-cópla* "hedgehog cactus". If the alternative that these naming units are loans is eliminated, the stress pattern suggests that they are constituted by more than one base each; it also ~~than~~ allows the placement of the boundary between them. In both cases, however, the suspected bases either can not be identified at all or else their identification is doubtful. Thus in the

case of *civi-cúuc*, while the suspected base *cúuc* was tentatively identified by the informant as meaning "to be standing up (pl.s. inanimate)", no clue was furnished concerning the suspected base *civi*. In the case of *ban-cépla*, while the suspected base *ban* was tentatively identified by the informant as meaning "coyote", no clue was furnished concerning the suspected base *cépla*.

[81] Note that the multiword status of the forms *do?ag=t=?ab kooji* and *do?ag=c=?ed kooji* can not be attributed to the morphological constitution of these naming units. The naming unit *kii=c=?ed-vakus* "rug, carpet (lit.: house-inside--flooring)" has a similar morphological structure but is a compound.

[82] The term self-reciprocal was suggested by Floyd Lounsbury, private communication.

[83] This distinction is conveyed differently in the closely related Pima language: mother-in-law and son-in-law are two separate terms among a set of self-reciprocal terms.

[84] This is in keeping with the following statement by Roger W. Brown and Eric H. Lenneberg: "It is suggested that there may be general laws relating codability to cognitive processes. All cultures could conform to these laws, although they differ among themselves in the values the variables assume in particular regions of experience." ("A Study of Language and Cognition", *Journal of Abnormal*

and Social Psychology, Vol. 49, ~~xxx~~ 1954, pp. 454-462). It seems that by "codability" the~~y~~ authors mean the existence of labels to refer to what Fishman calls "culturally encoded phenomena" (see fn. 44).

85 It is expected that the inventories of the Papago naming units that exhibit the two pairs of cognitive features, high lexical gestalt/low lexical gestalt, and individuation/disindividuation, are either unique to the Papago language-and-culture situational context or else that they are limited to the same type of culture, namely, a folk culture.

86 An inspection of the carriers of the category of person, namely the personal pronouns, reveals that the basic opposition is that of first person versus nonfirst person, as shown by the use of the reflexive marker ?e= (see figure 7 B). Examples of usage confirm this basic distinction and do not reveal additional ones (see sections 4.2.2.2.1.3.3. and 4.2.2.2.2.3.3). The type of opposition (see section 2. 2. 2. 2) constituted by the three members of the category of person is as yet undetermined.

87 The morphemic analysis which is at the basis for the inventory ~~of~~ and the grouping of the personal pronouns presented here (see figures 7) is that proposed by the author.

88 The category of possessiveness in Papago is nonpervasive:

some nominal naming units take the possessive marker =*ga* while others do not. An example of the fist type of nominal naming unit is *ñ=keli=ga* "my husband"; an example of the second type is *ñ=kii* "my house" (see section 1.1.2.3).

[89] Note that both the subject personal pronouns and the object personal pronouns are clause-function-determined, whereas the emphatic personal pronouns are not. The latter pronouns can function as, or cooccur with, either a subject or an object.

Note in addition that the status of "object" is defined here as referring to the object of either a predicate, a postposition or a noun. An instance of a personal pronoun as object of a predicate is *ñ=ñei* "he/she/it/they saw me"; an instance of a personal pronoun as object of a postposition is *ñ=veem* "with me"; instances of personal pronouns as objects of nouns are *ñ=kii* "my house" and *hega?i kii* "that house".

[90] Note that the grammatical categories which are suspected to have no direct bearing on the concept of identity may still have *indirect* bearing on this concept. This can not be ascertained, however, until each category has been investigated individually.

[91] Note that the cryptotype of animateness was shown to be an additional variable in the investigation of the category of nominal number (see section 3. 2. 3).

[92] An instance of x recent folklore is a tale collected by the author, entitled "The Mexican Story". Another instance is "The Yellow Hand", one of the tales collected by Harold Bell Wright (see his *Long Ago Told*, D. Appleton ¢ Co., New York, 1929).

[93] Note that a change of status as to humanness which results from a change of cultural contexts (e.g., in workaday reality *jevho* "gopher" is nonhuman, whereas in folkloric reality *Jevho-?O?odham* "Gopher-Man" is human) is clearly differentiated in Papago from a change of status as to humanness which results from a change of identity (e. g., *jevho ?e=vepogid* "to take the appearance of a gopher"). The latter change of status as to humanness is not considered relevant to the present analysis. It is considered relevant, however, to the cognitive study of the category of humanness itself. Some questions that pertain to such a study are: What are the conditions permitting -- or precluding -- a reversible change of status as to humanness? What are the permitted changes of status as to humanness?

[94] The following texts were the major source materials: folk tales collected by the author; an unpublished manuscript collection by Juan Dolores, a Papago Indian who was taught by A. L. Kroeber to record his speech (made available to the author by A. L. Kroeber); finally, the tales collected by Harold Bell Wright (see fn. 92).

95 A very good text for this purpose is the autobiography written in Papago by Juan Dolores (see fn. 94).

96 The context of the dream state of workaday reality as defined here includes the dreams and the visions experienced by ordinary people as well as those experienced by shamans.

In attempting to get a sample of naming units referring to entities classified as human or as nonhuman in the dream state of workaday reality from Ruth Underhill's accounts (see fn. 97), the status as to humanness of the Visitants could only be surmised. Visitants are the entities that transmit magical power to the human beings who "meet" them in dreams or visions. The status as to humanness of the entities that "give" songs to dreamers was not clear either. Ruth Underhill describes the experience of being "given" a song as follows: "...one day, in a natural sleep, he would hear singing. So does the Papago interpret the trancelike state of the artist who derives his material from the unconscious. 'He hears a song and he knows it is the hawk singing to him or the great white birds that fly from the ocean.' Perhaps the clouds sing, or the wind, or the feathery red rain spider..." (Singing for Power; The Song Magic of the Papago Indians, University of California Press, Berkeley, 1938, p. 6).

97 In addition to the source materials mentioned in fn. 94,

Ruth Murray Underhill's ethnographic account of Papago was utilized, especially her The Autobiography of a Papago Woman, American Anthropologist, Memoir ~~No~~ 46, 1936, her Social Organization of the Papago Indians, Columbia University Press, New York, 1939, her Papago Indian Religion, Columbia University Press, New York, 1946, and op. cit. in fn. 96.

[98] In both this case and that of the scalp or Apache effigy, Ruth Underhill does not specify whether they are believed to take a human shape only in the dream state or also in the waking state. This distinction is crucial for the initial interpretation attempted here. As it stands, the interpretation is based on the observation that it is apparently only in the dream state ~~si~~ that the supernatural manifests itself.

[99] For a specification of what is meant here by change of status as to humanness, see fn. 93.

[100] From the way in which these modes of status are manifested, it can be inferred that the members of the culture are aware of the distinction between them. Thus, the particle ge "seemingly, falsely like" occurs frequently in folkloric texts when reference is made to an entity which has ascribed status. The particle is used in the status identification question for the dream state.

In folk tales, Ho?ok, the mythological ogress, is mentioned in the following way: ge ?etp uḍ hemajkam "she may very well (lit.: potentially) have the false appearance of a human being". Ba?ag, the Eagle, another mythological monster, is referred to as follows: ge ?ex uḍ hemajkam "he is said (lit.: hearsay) to have the false appearance of a human being".

101 In view of the fact that ascribed status is restricted to folkloric reality and to the dream state of workaday reality (both of which involve the supernatural), the inference suggests itself that the supernatural interacts with human beings through the medium of ascribed status.

102 Note that when a change of identity takes place through magic (see fn. 92), this rule does not apply.

103 Among these entities are included those which can communicate with human beings in the dream state of either workaday reality or folkloric reality -- although their status as to humanness was not actually tested.

104 Note that the three sets (6, 7 and 8) do not show any longer in what cultural contexts a given entity can have a given status as to humanness. This information can be obtained, however, by going back to sets 2, 3, 4 and 5 (see figure 10).

105 This characterization of the three members of the category of person is based on the opposition of addresser

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verbal addressee, suggested by Roman Jakobson, in *Shifters, Verbal Categories and the Russian Verb*, Russian Language Project, Department of Slavic Languages and Literatures, Harvard University, Cambridge, Mass., 1957.

106 One instance of the difference between the two phonological patterns is the following: in songs, the lenis stops of normal speech are replaced by nasals. Thus, "heart" is *ʔiibdag* in normal speech but *ʔiimuinaŋa* in songs. The phonological pattern used in songs is described by Frances Densmore in her *Papago Music*, Smithsonian Institution, Bureau of American Ethnology, Bulletin 90, Washington, D. C., 1929.

107 See the section on "Ritual Oratory" in Underhill's *Papago Indian Religion* (see fn. 97), pp. 32-34. See also her *Social Organization of the Papago Indians* (ibid.), p. 80: "There was a definite technique for the admonition speech which was different from that for the ritual orations."

108 Note that none of the attributes or circumstances that may induce or inhibit the act of communication are taken into account. Attributes that may inhibit the act of communication are sex, age and social affiliation, e.g. belonging to ~~such as a~~ a particular kin group or dialect community. Circumstances that may inhibit the act of communication are the first menstruation of a young girl or the purification rites of an enemy-slayer.

109 Folk-taxonomic labels are the linguistic forms used to designate folk-taxonomic classes. Folk-taxonomic components are the linguistic forms which occur in construction with folk-taxonomic labels as further specifications of these labels.

110 Note that ñe?e does not refer to the singing of birds, for which special terms are used. Note in addition that ñe?e does not refer to modern dancing, for which a Spanish loan, vailla, is used.

111 The grammatical status (either single-word or multiword) of the naming units referring to the particular speeches listed here, as well as that of the name of the Girls' Puberty Songs called Vuaga Ñe?i, appearing further below, have not been ascertained.

112 The expressions in quotation marks correspond to the folk-taxonomic labels and components discussed previously (see fn. 109) and shown in figure 12.

113 Note that this technique does not take into account the factors mentioned in fn. 106. Note in addition that the cultural context within which a given act of communication is taking place is implied but not overtly specified (see fn. 104).

114

Set 8A in figure 11 lists among such entities some mountains, feathers and images of birds.

The close association between a feather and a bird or an image of a bird and a live bird is clear enough. In the case of a mountain further clarification is needed: the Papagos always visualize their mythological beings as living on top of a mountain. *?I?itoi*, the culture hero, lives on top of the highest mountain *Vav-Givulk* (Baboquivari). Both *Ba?ag*, the monster eagle, and *Ho?ok*, the ogress, lived in caves on top of a mountain. The first saguaro cactus, *Haaxañ*, went to live on top of *Giho-Do?ag* (Carrying-Basket Mountain). With mountains, therefore, the association is between the mountain itself and the mythological being said to live on it.

115 In one myth collected by the author, called"The Story of the Saguaro Cactus", a powerful medicine man makes two birds that are reported to talk, but only to him.

In one of the myths collected by Wright (see fn. 92), *Vuhi-Do?ag*, the Eye Mountain, is reported to call his brother mountain *Vav-Givulk* (Baboquivari) for help (op. cit. in fn. 92, p. 131).

In another myth collected by Wright, Little White Feather crying out for help is reported to be heard by a white winged dove who says: "I believe that is one of my feathers". (Ibid., p. 80)

116 The personal pronoun object that corresponds to the third person nonreflexive nonindefinite nondispersed has three manifestations: *Ø=* (zero morph), *g=* and *=j*. *Ø=* is found as object of a verb, *g=* ~ *Ø=* as object of a postposition, and *=j* as object of a noun. It is only when this personal pronoun has the status of object of a verb that the cryptotype of animateness seems to be involved. Thus, with animates, *Ø=* translates as ~~xxxxxx~~ "him, her, it", with inanimates, on the other hand, it translates as either "it" or "them" (see figure 7 B).

117 Note that in line with the definition of emphatic personal pronouns adopted here, these pronouns can have the status of either subjects or objects. The latter status is further specified as that of object of a verb, object of a postposition, object of a noun. With the two pairs of emphatic personal pronouns listed here, the status of object of a noun is ~~i~~ illustrated in the sequences *?iida?a kii* "this house" or *hega?i kii* "that house"; in these sequences the forms *?iida?a* "this" and *hega?i* "that" are interpreted as objects of the noun *kii* "house". This parallels the interpretation of *ñ=* in *ñ=kii* "my house" as object of the noun *kii* "house" (see fn. 89).

118 Note that in the analysis of the categary of nominal number, the semantic opposition characterizing the cryptotype of animateness itself has been shown to be one of capacity for volition (see section 3. 2. 3. 1. 2. 2).

The semantic opposition of capacity for voluntary mobility, on the other hand, accounts for the relation of the category of pronominal number to the cryptotype of animateness.

119 Note that Joseph B. Casagrande and Kenneth L. Hale in a forthcoming paper suggest that the pair of verbs *?oimmed* (sg.s.) and *?oiopo* (pl.s.) "to walk, move around" can serve as a diagnostic test for animateness ("Semantic Relationships in Papago Folk Definitions", in Dell Hymes, ed., *Studies in Southwestern Ethnolinguistics* [forthcoming]). Note in addition that the wind or water are said to "run" (*med*), but neither could "walk, move around" (*?oimmed*).

120 Note that the folk-taxonomic labels denoting voluntary mobility could be used to ascertain the status as to animateness of entities. They constitute a diagnostic tool which is easier to apply than the two pairs of verbs of position mentioned previously (see section 3.2.3.1.1.2) which require a subject in the plural.

121 It should be noted that cases of mountains shaking all over, or being displaced through magic, have been recorded, but never a case of a mountain "moving around" (*?oimmed*).

122 Compare the remoteness of cognitive contents from the naming units from which they are derived to the relative

closeness between the minimal units of the linguistic structure (phonemes, morphemes, lexemes) and the behavioral units from which they are derived (informant words, naming units).

[123] This applies equally to the aspect of the cognitive system that is manifested in the culture. The minimal units are the themes of the culture. They are no longer in a one-to-one relation to the aspects of the cultural system. Cognitive contents of given aspects of the culture, on the other hand, are assumed to be in a one-to-one relation with these aspects.

[124] Note that in this case the theme is practically the same as the underlying concept. This is not surprising in view of the fact that the cognitive content of the property of fusion that is specific to Papago has not been ascertained as yet (see end of section 3. 2. 4. 3 and fn. 84 and 85).

[125] The claim that these themes are specific to the Papago language-and-culture situational context becomes stronger as soon as the manifestations of the same underlying concept are investigated in anotherlanguage-and-culture situational context.

An example is the concept of identity manifested by the category of gender in American English (see fn. 32). The three members of the category are represented by the personal pronouns he, she, it. They seem to enter into two oppositions: (1) it versus non-it (i. e., either he or she); (2) he versus she.

The suspected semantic opposition that corresponds to the opposition it versus non-it is that of upgrading versus downgrading. The suspected semantic oppositions that correspond to the opposition he versus she are, on the one hand maleness versus femaleness (physiologically determined), on the other hand ~~friendliness~~ lack of awesomeness versus awesomeness (figuratively determined).

The suspected cognitive oppositions that correspond to the semantic oppositions are: (1) corresponding to upgrading versus downgrading, an opposition of superiority of fully sexed entities versus inferiority of other entities; (2) corresponding to both maleness versus femaleness and ~~friendliness~~ lack of awesomeness versus awesomeness, an opposition of maleness conceived as ~~friendliness~~ lack of awesomeness versus femaleness conceived as awesomeness.

Although no theme has been postulated as yet for the concept of identity in American English, it is reasonable to assume that, since the cognitive content of a category manifesting this theme differs so markedly from the cognitive contents of categories manifesting the same concept in Papago (see Diagram IX), the American English theme likewise will differ from the corresponding Papago theme.

126 It is proposed that this might be achieved by psychological testing. The question that arises in this connection is how the different levels of abstraction lend themselves to such testing (see fn. 4).

127 Thus, in the Follow-up Study and in the revised version of the Case Study, none of the cultural variables recognized as relevant has been treated in detail. Moreover, in the three studies only a relatively small sample of naming units has been examined in each step.